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Vol. XXVII

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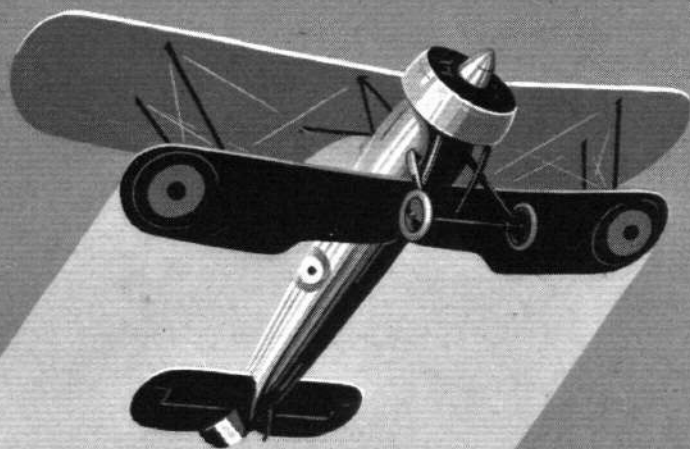
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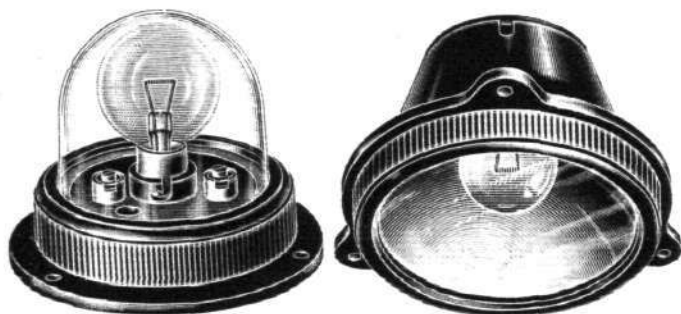
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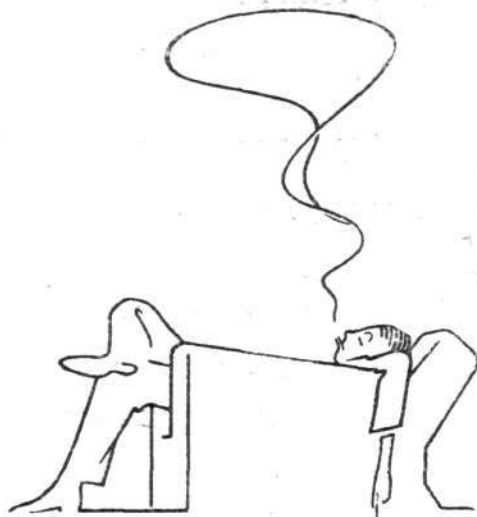
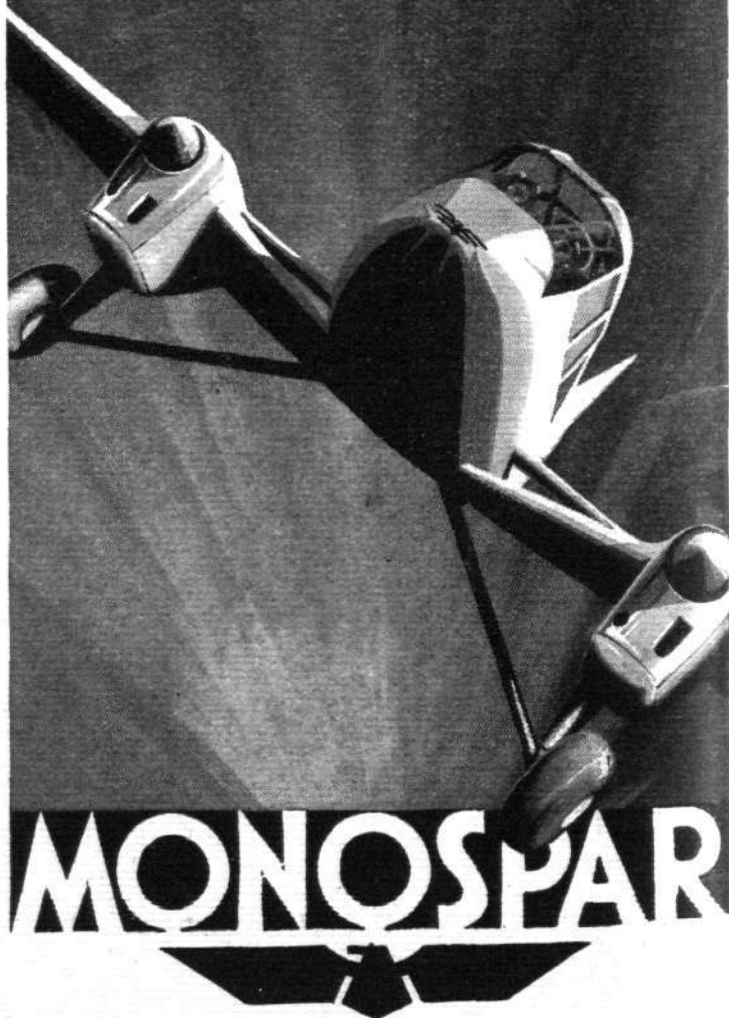
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Riposte

ANYTHING in the nature of an armaments race is objectionable to the British temperament, yet Germany is forcing Britain into something very like a race in air armaments. In the debate in the House of Commons last Thursday the Prime Minister mentioned Herr Hitler's admission of German equality with the whole British Air Force, and added: "Whatever may be the exact interpretation of this phrase in terms of air strength, it undoubtedly indicated that the German force has been expanded to a point considerably in excess of the estimates which we were able to place before the House last year." Then, after alluding to the assurance given by Mr. Baldwin that "in no circumstances would we accept any position of inferiority in regard to whatever air force might be raised by Germany in the future," Mr. MacDonald went on to say: "The Government take the earliest opportunity to state publicly that the Lord President's declaration stands, and that His Majesty's Government are already taking steps for the further and accelerated extension of the British Air Force to implement my right honourable friend's declaration."

This statement does not imply a mere acceleration of the "flexible" programme of expansion announced last year, but a totally new programme. More squadrons over and above those already provided for will have to be raised. It may also fairly be assumed that all the squadrons in this new programme will be bombers and fighters of the Home Defence Force. It is true that we need more squadrons and flights in the Fleet Air Arm, and also more, many more, flying-boat squadrons, but a sudden and considerable increase in both those directions is not being forced upon us by Germany. She is one of the nations within striking distance of our shores, and the great need is that our Home Defence Force should not be inferior to the air strength of any Power within that distance. Germany cannot as yet threaten our position on the seas or overseas, and so the development of our Fleet Air Arm and our flying-boat squadrons

may proceed at a normal rate. By the expression "a normal rate" we do not intend to imply the stagnation of those years in which we were setting an example of disarmament to the world, for both these branches of our Air Force certainly need solid increases; but the rate of increase need not depend on the bombing strength of General Göring's new creation. Our riposte to that lunge must be to enlarge the Command, Air Defence of Great Britain.

We must, it seems, reconcile ourselves for a while to a sort of race in air armaments, distasteful as it may be. To some extent this will take the form of a contest between the brains of German and British designers. Still more will it be a competition in organisation; and our Air Ministry, already pushed to provide for the first expansion which was announced last year, will have to stretch itself to cope with the new programme of expansion shortly to be announced. The bedrock of the matter, however, will be finance, and there Britain holds trump cards. Our country, thanks to the splendid efforts of the National Government in general and of Mr. Neville Chamberlain in particular, has gone farther than any other country in the world in its recovery from the economic depression. We do not want to expend some of our partially regained prosperity on armaments beyond what is necessary to make our country and Empire safe, but so far as the purse is concerned Britain can outlast Germany. It would be very interesting to know what the German Finance Minister thinks about Herr Hitler's ideas of a flying corps able to cope with France and Russia at the same time, a navy as strong as that of France, and a conscript army which shall be the strongest in Europe. Such armaments will cost vast sums, and must mean gruelling taxation of the German people. They are being sedulously schooled in the idea of sacrificing themselves for the State, but one cannot help wondering how long their enthusiasm for Nazism will last if they have to pay that very expensive piper.

There must be sane heads in Germany which will be shaken at the spectacle of German policy bringing about the collaboration of such diverse and such powerful nations as Britain, France, Italy and Russia. In his

recent address to the League of Nations Union Sir Philip Sassoon, commenting on the idea of an international air force, used the words: "Though dangers shared in common may unite a nation, or a group of nations like those composing the British Isles, so that law and order may be preserved among them by a system of police, one cannot hope for similar results among independent nations, unless a similar condition of mutual danger forces them to set aside their individual differences and combine for mutual protection." Germany's recent action goes some distance towards fulfilling the conditions laid down by Sir Philip, and the result has been a drawing together of Fascismo, two Democracies, and the Soviet. Such an unexpected development must surely have some significance for the cooler brains in Germany.

A danger foreseen is often a danger discounted. The Romans put it more succinctly—*Si vis pacem, para bellum*; and this old saying still has force, although some people of tender heart and softer brain may scoff at it. If Germany had stood alone in shining armour amid an unarmed world, who knows whether she might not have tried to reverse the verdict of 1914-1918? In such a case war and victory might well have been the cheapest course for her to pursue. After a speedy victory, a nation can economise on armaments and ease the strain of taxation. Moreover, many will believe that if a victorious Germany were to stipulate for indemnities and reparations from the vanquished she would see that those

indemnities and reparations were paid, as they were in 1871. With the four great nations of Europe awake and armed that prospect becomes less imminent, and we are able to take comfort from General Smuts' belief that war in Europe is not likely for the next thirty or forty years. In sober truth it is incredible that Germany alone should challenge a Europe in arms, whatever she might have felt inclined to do were she stronger than any likely combination of other Powers. Therefore, if our arming buys peace, it will have been a good investment; in fact, the cheapest course which we could pursue. The country will feel no small gratitude to the Government which has not hesitated to be bold at a time when boldness was the most prudent course.

For the details of the new scheme we must all await the coming pronouncement of the Government. Apart from its cost the increase is welcome. It will give valuable practice to the Air Ministry in organising a rapid production of material and of personnel. Once production has got into full swing it takes longer to train the highly skilled pilot and the highly skilled fitter than it does to build aircraft and engines, but the work on the personnel is more straightforward. To expand the production of the manufacturing firms at short notice will be a great test of the plans drawn up some years ago. If the plans work well and the aircraft and engines appear promptly, one considerable anxiety for the future will have been removed.



ON A CRUISE : The tourist who wanders in May round the coasts of Great Britain, and particularly of Scotland, seldom fails to sight the four "Southampton" flying boats of No. 201 (F.B.) Squadron, sometimes at Oban, sometimes at Stranraer, and sometimes in the Firth of Forth. No. 201 F.B.S. is the only unit in Home waters which possesses four flying boats. The "Southamptons" will soon be replaced, possibly by the Saro A.27 "London."

The Outlook

A Running Commentary on Air Topics

The Auxiliary Sailplane

THERE must be a large number of "A" licence pilots who, for one reason or another, are not able to use a light aeroplane for anything more than amusement, even if educational amusement. At the same time, there must be many glider pilots who have, because of the dual inconvenience of site position and lack of spare time, returned to the power machine.

For such people the auxiliary sailplane described on p. 508-9 of this issue may prove to be a godsend. If expectations are realised, the sailplane pilot will no longer be dependent on locality and motor or human assistance in the initial climb to regions where real soaring is possible. Furthermore, if one useful up-current is lost he will be able to use his auxiliary motor to reach another area of possibilities. The machine is not designed as a serious method of long-distance conveyance, but merely as a soaring machine without the disadvantages which have previously been inseparable from the sport.

A Comparison

AFTER all, if one really wants to travel quickly from A to B an aeroplane would still be used, just as the most earnest yachtsman uses a power-driven vessel on such occasions. But for sheer interest and entertainment no one denies the charm either of the sailing yacht or of the sailplane.

With this new development it seems possible that the normally experienced private pilot may, with care, learn to handle the efficient glider without the need for long-period instruction, and will eventually, perhaps, learn to find his own soaring areas. Be that as it may, a pilot could not come to any great harm provided that he was working from an aerodrome large enough to allow him to discover the approach angle in various conditions without resorting to low and, perhaps, flat turns.

Certainly, the whole idea, carried out as it is so cleanly, is worth close attention, and it may give the thousand-odd "A" licence pilots who, for reasons of expense, no longer fly, something to think about.

Claims of the "Pou"

THE similarity of sailing and "sailplaning" inevitably calls attention to the "opposite number" of the low-power motor boat. Will the *Pou-du-Ciel* provide this? Time will tell, but at least the signs are promising. Recently M. Mignet, the designer of the *Pou*, made the first cross-country flight on record in a machine of this type. Armed with a special permit granted by the French Air Ministry, he flew from Paris to Lille via Dieppe and Berck, encountering very unfavourable weather conditions. But he got through, and managed to give demonstrations on the way, including one of steeplechasing at the Paris-Plage racecourse.

Another French amateur constructor, M. Andre Baumann, has installed a 40 h.p. Salmson in his *Pou*, and on this M. F. Kohler has discovered an amazing climbing capacity. The speed is already about 100 m.p.h., and the enthusiastic constructor expects to get this up to about 120 m.p.h. by "cleaning up," fairing, etc.

At the same time, an increase in power to the extent of doubling it is not altogether a good thing. The *Pou* is reported to fly quite well with 20 h.p., and one feels

that a really cheap aeroplane of that power cruising at 50-60 m.p.h. is, as a first step, more desirable than spectacular performance with 40 h.p. When Sir John Carden gets his new four-cylinder water-cooled engine into production, there is quite a possibility of the £100 aeroplane becoming something more than a dream. (Cynics will say nightmare!)

One Pound Per Horse Power

THIS week the Bristol Aeroplane Company has disclosed the results of tests on a "Pegasus X" engine which are little short of miraculous. Weights below one pound per horse power have previously been attained in racing engines. For instance, some of the engines fitted in the Schneider seaplanes weighed about three-quarters of a pound per h.p., but we believe that the "Pegasus X" is the first production engine to get down to near enough one pound for every horse power developed. The first batch of these engines is in hand for delivery in the autumn, intended for "prototype" aircraft, and real production in quantities will be in operation by next spring.

Although the normal power of 820 h.p. at normal speed is in itself remarkable enough for an engine weighing but 995 lb., the remarkable take-off power of 920 h.p. is really the outstanding achievement. It has not been obtained by speeding-up the engine, which runs at the relatively low speed of 2,250 r.p.m. at the take-off power, but by increasing the boost pressure. This again, apart from detail improvements in the engine itself, has been made possible by the introduction of 87 octane fuels. As it seems likely that in time fuels of even higher octane values may be sanctioned, one ought to see some startling improvements in aero engine and aircraft performance during the next year or so.

World Co-operation

JUDGING from the figures given in the study of air transport economy published by the League of Nations Secretariat, the need for co-operation among European air line operators—and for that matter, world air line operators—is as great as that for co-operation in our internal system.

Only in this country, Finland and the Netherlands do traffic receipts exceed the amount of the subsidy paid in one form or another. Only in this country, so far as we know, are there any unsubsidised companies which actually pay their way—a fact which speaks more volubly for British aeroplanes than any general performance figures can ever do.

Of course, a very great deal of the money spent would, in any case, still be spent in general development, but the cost could so much more satisfactorily be divided among the different countries. One has only to take the single case of the two separate companies, Air France and Deutsche Luft Hansa, flying mails across the South Atlantic, to realise the hopeless futility of some kinds of independent development. Yet the difficulties of actual co-operation and of traffic pools are, in the present state of international relationships, almost insuperable, and, while air line safety depends so much on the personal element, passengers will still insist on flying with pilots of their own nationality, and in machines made in their own country.



Above and on the right are general views of the gathering on the fine Heathrow aerodrome. (*Flight* photographs.)

THE R.Ae.S. ENTERTAINS

Brilliant Flying and a Fine Concourse of Modern Civil and Military Aircraft at the Society's Garden Party

THE Clerk of the Weather obviously co-operated with the Royal Aeronautical Society in the holding of its annual Garden Party last Sunday. A sun that seemed unbelievably hot after the grey days of a dull spring blazed on to the gay scene at the Fairey Aviation Company's fine aerodrome at Heathrow, on the Great West Road. Later, coppery cumulus clouds suggested thunder, but the threat never materialised.

Rarely has a more representative gathering attended a flying event. For all practical purposes it may be said that everyone who is anybody in British Aviation was present. The President of the Society, Lt. Col. J. T. C. Moore-Brabazon, received the visitors in a special enclosure provided for the occasion, and few were the well-known personalities not seen at one time or another in the enclosure or among the many aircraft lined up for inspection. Lord Londonderry, Secretary of State for Air, Sir Philip Sassoon, Under-Secretary of State for Air, and Lt. Col. F. C. Shelmerdine, Director-General of Civil Aviation, were

among the Air Ministry representatives present. The R.A.F. and the industry were very fully represented, as was also aeronautical research. Foreign Air Attachés added that touch of international good will without which no big air event is complete, and several foreign air line operators were noted among the multitude, including Mr. A. Plesman, of the K.L.M., and Capt. Carl Florman, of the Swedish Air Lines. At least one foreign aircraft constructor had taken the opportunity to inspect our latest types—Mr. Frederick Koolhoven (if, indeed, he can be classed as foreign). Altogether it is a very long time since we have seen so many notable people gathered together at an aviation event, and the R.Ae.S. is to be congratulated on the success of its first outdoor gathering of the year.

One's chief reaction to the wonderful *concours* of aircraft at Heathrow was a feeling of regret that the non-aeronautical public was not able to enter the aerodrome and whet its curiosity about aeroplanes at close quarters; but, of course,

(Below) A section of the long line of machines on exhibition. In the foreground is the B.A.C. "Drone," then a Spartan "Cruiser," a Railway Air Services D.H.86, the K.L.M. Douglas D.C.2, and others.

(*Flight* photograph.)



At the reception: Lt. Col. J. T. C. Moore-Brabazon, president of the R.Ae.S., with the Soviet Ambassador and his wife. On the right is Mr. C. R. Fairey. (*Flight* photograph.)





Sqn. Ldr. England (chief test pilot and commercial manager of Handley Page Ltd.) and Mr. Handley Page chat with two friends.
(Flight photograph.)

the N.A.P. has an awkward habit of prodding things with umbrellas to find what they are made of, and in any case there were quite enough of the semi-initiated to supply that element of wonder and interest which well justified the trouble to which the R.Ae.S. and the co-operating firms had gone in lining up the exhibits and labelling everything for their benefit. It was even possible to read what the average aeroplane would cost you to buy.

It would have been difficult to find a more representative display. There was at least one example of everything, ranging from the Carden-Baynes sailplane with its tea-cup-cylinder engine to *fauna* of the K.L.M. Douglas D.C.2 and Fairey "Hendon" calibre.

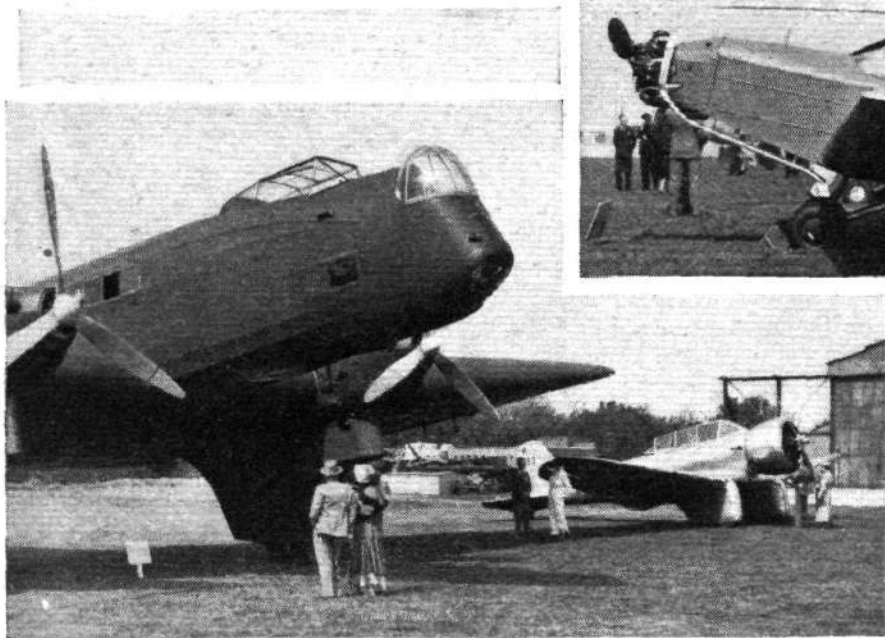
Among the machines toeing the line there were (to mention the chief examples) an Airspeed "Courier" and "Envoy," a brace of Avro "Commodores," several small De Havilland aeroplanes of various persuasions, including Miss Jean Batten's "Moth" and Lord Sempill's "Puss Moth," both with the dust of Australia, metaphorically speaking, fresh in their intakes; large D.H. products, as represented by 86s and 89s of Railway Air Services; Miles "Falcon" and "Hawk"; Percival "Gull"; a trio of Autogiros; a Short "Scion"; a Spartan "Cruiser"; a Saro "Cloud"; Monospar S.T.10 and 12; B.A. "Eagle" (B.A. is henceforth the official designation of the British Aircraft Manufacturing Co.'s products); and the little Douglas-engined B.A.C. "Drone," which still drew its meed of eager public curiosity in spite of the even smaller Carden-Baynes counter-attraction. Alongside the Fairey "Hendon" (which, incidentally, has now grown a nose "conservatory" and three-

bladed airscrews) was Farnborough's Northrop bomber, which the programme, perhaps sharing the international vogue of dissimulation, described as a "Northrop air liner."

Still more types were to be found in the line-up of machines that were billed to show their paces in the air—in which element, perhaps, we may list them. Following the official reception by the President (Lt. Col. J. T. C. Moore-Brabazon) and Council, Flt. Lt. Clarkson opened the ball with his Pobjoy-engined Comper "Swift." He gave his usual polished performance, the most telling feature of which is a variety of rolls in, one might say, considerably more than three dimensions. The gentlemanly hum of the little Pobjoy was followed by the thudding roar of the 560 h.p. "Panther VI" as Flt. Lt. Turner-Hughes pointed the A.W. "Scimitar" groundward at full throttle and then flung it skyward to 2,000ft. or so. Every minute of his contribution was a joy to watch, perhaps none more so than a series of super wing-wagglings (or, if you prefer it, reversed half-rolls) across the aerodrome at 200ft. He finished up with a baker's dozen of consecutive rolls off the top of a loop made "straight off the ground."

In music-hall parlance Turner-Hughes was a difficult turn for the next act on the bill to follow, but Flt. Lt. P. G. Lucas, in a Hawker "Hart" ("Kestrel VI"), did so right nobly; a particularly effective item was what a motorist might call a "top gear climb from a nearly standing start." In other words, Lucas flew leisurely across the aerodrome on a whiff of throttle, then pointed the "Hart's" nose sharply upward and opened right out; though less spectacular than the rocket business, it was just as convincing.





(Above) Not a new type of Autogiro, but an amusing juxtaposition with the new B.A. "Swallow"; incidentally, the "Swallow" displayed almost Autogiro-like slow-flying capabilities. (Left) The Fairey "Hendon" night bomber in its new guise—with a nose "conservatory" and three-bladed airscrews. In the background is the Northrop bomber from Farnborough. (Flight photographs.)

Soon after starting, Flt. Lt. Lucas politely stood aside, so to speak, to allow the landing of Mr. Collins, of the London Gliding Club, who had come all the way from Reading in his "Rhönadler," having been towed out of that aerodrome by Flt. Lt. Milne, with a Miles "Hawk." But things had not quite gone according to plan, for when, after about ten minutes, they had reached 2,000ft., a bad bump broke the tow-line; fortunately thermal currents were plentiful, and Mr. Collins was able to sail to his destination without difficulty; he said that at one time he reached 4,400ft. The "Rhönadler" is a high-performance sailplane, and not an aerobatic type, but the pilot executed a loop and some steep turns on his way in. His landing charmed everybody; coming in fast, he flattened out a foot from the ground, and then held-off dead horizontal for a good 200 yards, ultimately touching-down on his skid with thistledown gentleness.

Celestial Loitering

Next, Mr. F. C. Coveney Irvin-Air-Chuted from a "Moth" piloted by Mr. S. H. G. Trower, and then Flt. Lt. "Tommy" Rose proceeded to demonstrate, at almost indecently low speeds, the possibilities of the split flaps on a Miles "Hawk."

Another brilliant exhibition of celestial loitering was given by Flt. Lt. J. B. Wilson, on a B.A. "Swallow" with redesigned surfaces; it has squared-off wing tips and an angular-shaped rudder of slightly smaller area; the alterations detract slightly from the appearance, but Wilson's performance, much of it done with a "dead" airscrew, certainly bore out the claim of a 30-112 m.p.h. speed range. The machine, incidentally, also has a redesigned and greatly improved undercarriage.

Next, Mr. "Bill" Thorn proceeded to upset the laws of aerodynamics in an Avro "Cadet," which he crazy-flew crabwise and upside-down, but seldom straight ahead, winding up with an unbelievably slow half-roll on to his back.

Mr. H. A. Marsh showed the crowd that an Autogiro has

speed and manœuvrability as well as "downrightness," and then Flt. Lt. Staniland took up a Belgian-marked "Firefly" ("Kestrel II S"), and gave a display that was one of the real high-spots of the meeting. Knowing Staniland's ability anywhere, one would hesitate to say that he is at his best on this, his home ground, but his exhibition was incredibly inspiring, more especially as most of it was done at a very low altitude; the spectator gets an entirely new "line" on an ordinary roll when he sees it carried out almost horizontally in front of him instead of high above. Staniland introduced a touch of humour by crossing the aerodrome with his tail right down and the throttled-back engine making a sort of 1925-light-aeroplane wuffling noise, then went on to a dramatic *finale* consisting of a number of tight circuits just over the heads of the crowd. *Phew!*

Mr. C. A. Washer followed with a very pretty display in a Mk. IIa "Bulldog" (Jupiter VI), which he seemed able to transform from a cooing dove to a snarling projectile, and back again, in a quite uncanny fashion; and the flying programme concluded with a display of the impressive liveliness of the Monospar S.T.12 (two Gipsy Majors) in the hands of Flt. Lt. H. M. Schofield.

The afternoon having passed off without accident, Bell's Asbestos Company kindly remedied the omission by staging a very impressive one. A real, live man sat calmly in a fuselage surrounded by shavings to which a light was presently applied. When the flames enveloping this cool individual were fully



Sir John Carden was kept busy demonstrating the operation of the retractable two-stroke engine of the Carden-Baynes sailplane.



Another group at the reception; it includes Mr. C. R. Fairey, Chevalier Parmentier, of K.L.M. fame, and Lieut. Col. Moore-Brabazon. (Flight photographs.)

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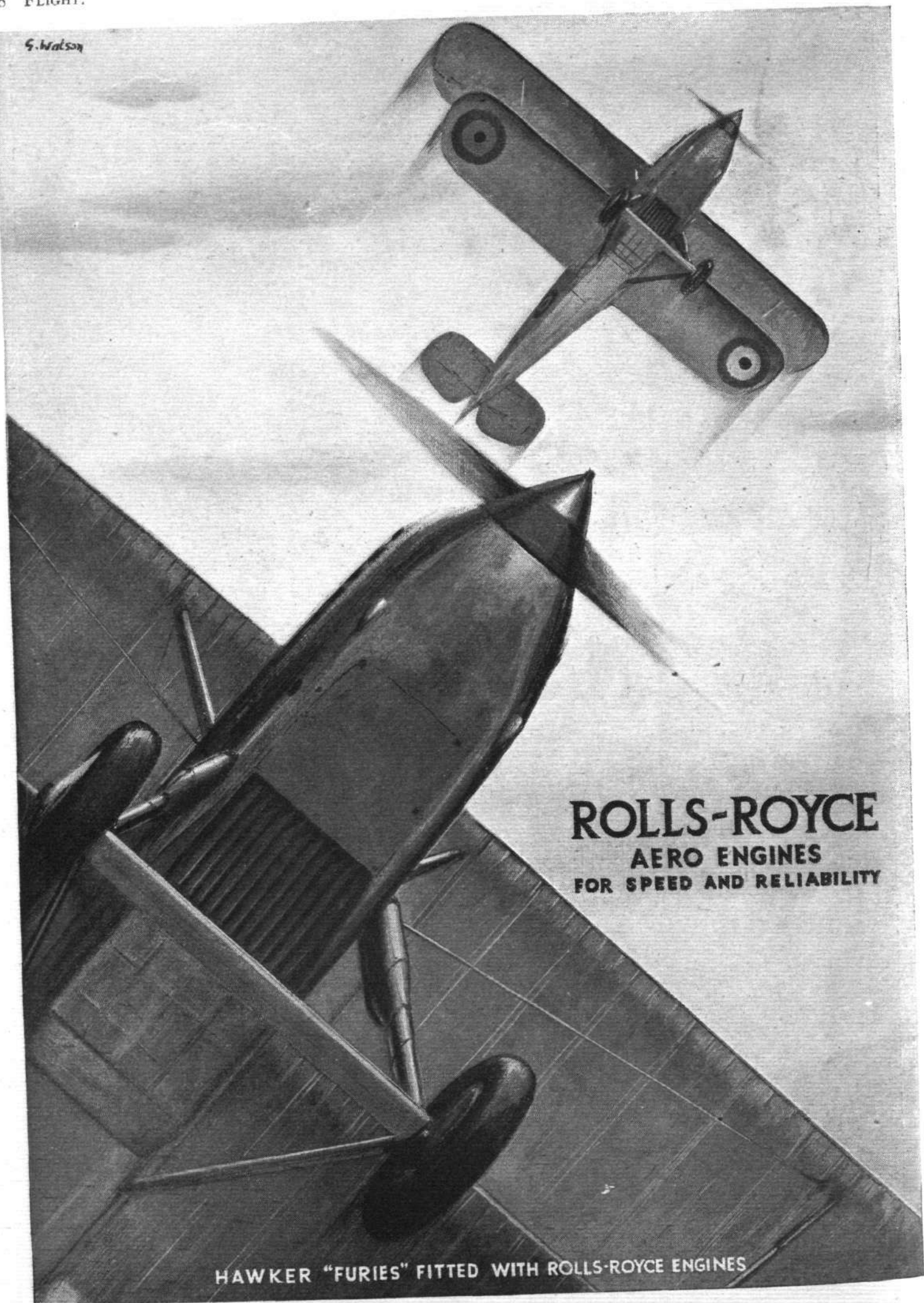
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From Reading on the wings of the wind—Mr. Collins alights in the "Rhönadler." (Flight photograph.)

fifteen feet high, two others waded in, and, leisurely tearing apart pieces of blazing aeroplane, "rescued" him. Since the three of them were wearing flame-proof asbestos suits and hoods, a thoroughly pleasant time was, so to speak, had by all, and it seemed quite a pity when the conflagration was subdued instantly by a 30-gallon "Firefroth" appliance, as supplied to the Royal Air Force by the General Fire Appliance Co.

In one afternoon it would obviously be impossible to arrange for all the number of aircraft types on view to be demonstrated, and many well-known and a few less well-known types were lined up for inspection, and there were few moments during the afternoon when any of them were not being carefully examined by experts and others. One wonders how many looked at the Fairey "Fox" without realising that within the neat cowling was concealed a very hush-hush new engine with which rumour has been busy these many months. Truth to tell, there was little enough to hint that there was anything unusual about the power plant, but the number of exhaust stubs, twelve on each side, led one visitor to ask if the machine had a 24-cylinder engine!

The Static Exhibition

Within what, on normal weekdays, is the Fairey flight hangar were gathered a number of interesting exhibits, and in spite of the attractions of the flying exhibitions many visitors found time to inspect the equivalent of what has come to be known at the S.B.A.C. Hendon Display as the "static" exhibition. By no means all the firms were represented, but there was quite enough to hold the interest.

The history of aviation was catered for by photographs belonging to the R.Ae.S. and models by Mr. J. Allen. Rather more modern models were shown by the Model Transport Co., and very excellent they were. Air photography was represented by the Air Survey Company and the Williamson

Manufacturing Co. (cameras). A Fairey "Seal" seaplane represented full-scale construction, as well as a Fairey float, and a number of Fairey metal airscrews, two-bladed and three-bladed, and Fairey variable-pitch airscrews. Aero engines were shown by the Bristol Aeroplane Co., Napiers and Rolls-Royce, and numerous samples of finishes were exhibited by Cellon, Ltd.

Instruments were well represented, Smiths Aircraft Instruments in particular having quite a large exhibit. Short and Mason instruments and "Sestrel" compasses vied with the "Husun" compasses of Henry Hughes and Son as centres of attraction, while the Reid and Sigrist reaction tester was popular with the younger generation keen on becoming pilots.

Simmonds Aerocessories included an interesting way of demonstrating the Simmonds-Corsey control working, while Mr. Dowty's hydraulically operated retractable undercarriages and tail wheel attracted attention from designers. The Dunlop Rubber Co. had a range of wheels and tyres on view, as well as a demonstration outfit of their pneumatic brake. A reminder of the importance of lubrication was provided by Tecalemit grease guns and lubricants.

Radio is playing an increasingly important rôle in commercial and other civil aviation, and representative examples of transmitters, receivers and generators were shown by Marconi and Plessey.

In addition to the actual demonstration outside, the Irvin Air Chute Co. had a stand in the hangar, where the advantages of the Irvin parachute were explained.

Altogether the "static" exhibition was varied and interesting, and well repaid those who elected to miss a few flying events for the sake of inspecting the instruments and equipment.

And so home—with an amusing glimpse of dignity and impudence as the departing K.L.M. Douglas and Kronfeld's "Drone" crossed the aerodrome boundary at the same moment.

"High Lights" of Empire Air Day

In *Flight* of April 11 was given a list of R.A.F. stations which will be open to the public on Empire Air Day, Saturday, May 25. Two alterations of plans have since been made. First, Donibristle will not be open to the public, which means that only three Scottish stations—the Training Base for the Fleet Air Arm at Leuchars and the aerodromes at Abbotsinch and Turnhouse—will be on view. One more aerodrome has however, been added to the list. This is the R.A.F. station at Catterick, Yorkshire, which houses No. 26 (Army Co-operation) Squadron, equipped with Hawker "Audax" biplanes.

"High lights" of displays to be given on Empire Air Day include manoeuvres by the Hawker "Furies" of No. 25 (Fighter) Squadron, a dive bombing attack by a flight of "Harts" belonging to No. 33 (Bomber) Squadron, which will be given at Bicester, and camera gun practice against ground targets by a "Sidestrand" or an "Overstrand" of No. 101 (Bomber) Squadron at the same aerodrome.

At Tangmere, Nos. 1 and 43 (Fighter) Squadrons will give a display of flying similar to that which will be staged at Hendon on June 29, and there will be aerobatics by one aircraft of each squadron. A quick "getaway" will be demonstrated by No. 43 Squadron, which later will visit Ford (2-55 p.m.), Shoreham (3-10 p.m.), and Wilmington (3-30 p.m.) aerodromes. One pilot will broadcast, by radio-telephony, a description of his manoeuvres, and a demonstration of air drill by No. 1 Squadron using radio-telephony will be given. Two mock air fights will also be staged at Tang-

mere, and the flying display will end with a formation flight by the Battle Flights of Nos. 1 and 43 Squadrons in which a quick "getaway" and climb to 6,000 ft. will be demonstrated.

At Hawkinge the storage section, in which are contained a wide selection of aircraft ranging from obsolescent types to those awaiting issue to Service units will be on view. In addition, the "running up" section, with aircraft trying out their machine guns at the butts, will be open to the public gaze.

A Swiss Gliding Meeting

From September 4-18 an international gliding meeting will be held on the Jungfraujoch at an altitude of 11,340 ft. The meeting will be sponsored by the Swiss Aero Club.

Troubles for the Tourist

The Royal Aero Club and the A.A. announce that foreign aircraft are requested to fly at an altitude between 984 and 1,969 ft. for a distance of fifteen and a half miles after crossing the Turkish frontier, in order to facilitate identification by the authorities.

The licences of the following German aerodromes have been withdrawn and should only be used in extreme emergency: Schleissheim (Munich), Würzburg, Braunschweig, Dessau, Magdeburg, Halle-Nietleben, Hildesheim, Friedrichshafen, and Schwerin. Baden-Baden and Giessen are now open, and Duisburg, Wyk auf Föhr, Osnabruck and Frankfurt-on-Oder are closed to air traffic until further notice.

THE FOUR WINDS

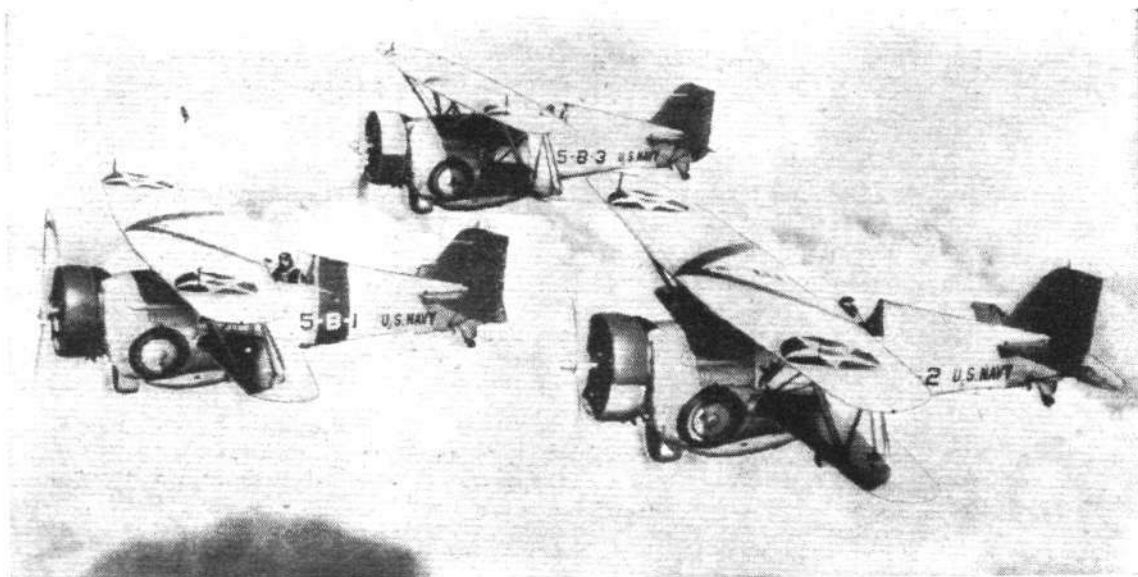
ITEMS OF INTEREST FROM ALL QUARTERS

A Feline Fade-out?

A "hush-hush" new Armstrong Siddeley engine has been named "Mastiff."

British-designed Slots for U.S.

Three floatplane amphibians, each with devices for increasing the speed range, were subjected to competitive trials by the U.S. Navy. The winning machine, of which 135 examples have been ordered, utilised Handley Page "full span" slots and flaps.



For Cadastral

Survey

A Monospar S.T.12 has been ordered by the Spanish Government for photographic work in connection with the compiling of maps, from which the area, nature and extent of taxable land can be gathered.

A Protracted Glide

Accompanied by a passenger, Rastorguyev, a Russian gliding instructor, has remained aloft for 26 hr. 29 min. in an SH-5 glider, thus, it is claimed, breaking the world's endurance record for two-seater gliders.

QUEER BEASTIES FROM AMERICAN WATERS. A flight of Curtiss BF2C-1's from America's latest aircraft carrier *Ranger*. These peculiar-looking retractable-undercarriage biplanes are fitted with 700 h.p. "Cyclones" giving a maximum speed of well over 200 m.p.h., and, apart from their employment as fighters, are used extensively as dive bombers, when they carry nearly 500 lb. of projectiles apiece.

Not to be Missed

Readers of *Flight* are strongly advised to obtain to-morrow's issue of *The Autocar*, which will contain an announcement regarding a remarkable map offer.

French Power for a C.30

A C.30 Autogiro intended for a French destination has been fitted with a 200 h.p. Salmson nine-cylinder radial, driving a Ratier airscrew.

"Moscow Flier—Platform Four"

The possibility of landing an aeroplane with a train of gliders in tow was demonstrated recently in the U.S.S.R. A Y-2 machine and a glider which it was towing landed simultaneously—the glider some 65 ft. to the side of the aeroplane.

Round the Maypole

Two hundred Wright-engined fighters, about 120 of the famous four-engined bombers, 37 bombers with twin engines, and 330 general-purpose biplanes were among the 700 first-line military machines which paraded over Moscow on May Day.

"Mew Gull" Mods.

Mr. E. W. Percival states that his "Mew Gull" is being still further cleaned up for the coming season. Alterations to the fuselage shape and undercarriage fairing should add a few m.p.h. This fascinating little aeroplane will probably race again for the King's Cup and, possibly, make a record-breaking trip to Paris.

Twenty-five Years Ago

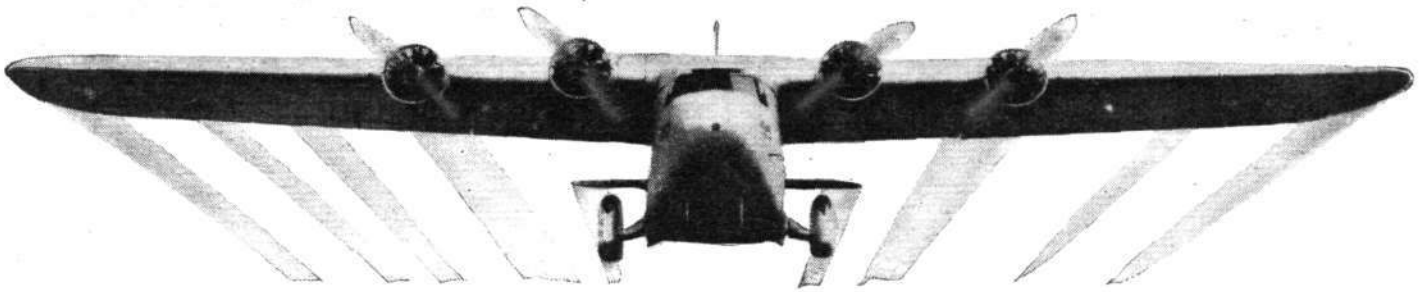
From "Flight" of May 7, 1910

"It is Sir Hiram Maxim's intention, when the preliminary experiments with his biplane have been brought to a satisfactory conclusion, to fit gyroscopic control. The gyroscope is designed to operate, through a relay mechanism, a cylinder containing a piston to which an operating rod is attached."



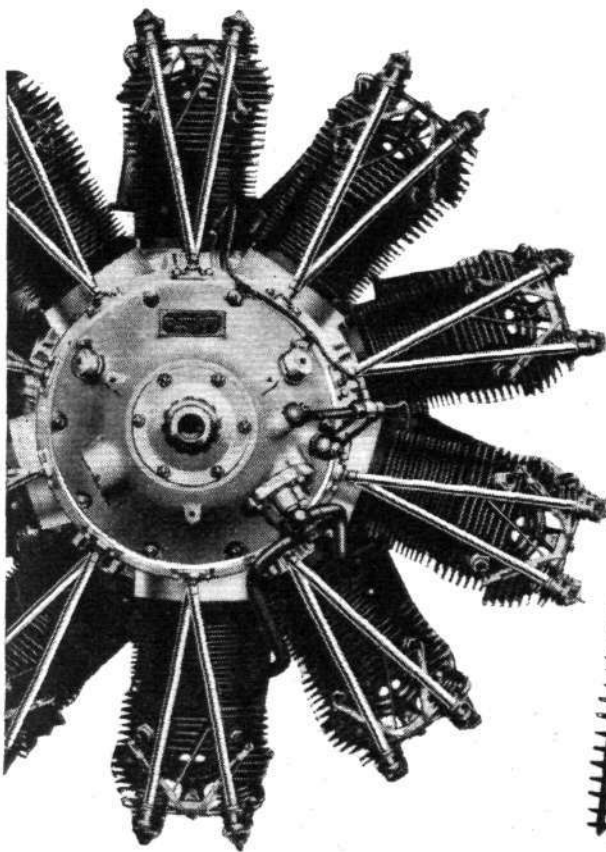
—AND THEIR LAIR The U.S.S. *Ranger*, newest American carrier, is 770ft. long and 90ft. in beam. She carries four squadrons of fighter-bombers and a complement of "utility" amphibians, bringing the total of American carrier-based aircraft to 271. Her crew consists of 113 officers and 1,407 men.

2,075 MILES IN A DAY



RECORD FLIGHT IN SOUTH AFRICA BY SIDDELEY SERVALLS

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2,075 MILES IN A DAY IMPERIAL AIRWAYS RECORD IN AFRICA

FROM OUR OWN CORRESPONDENT

JOHANNESBURG, MARCH 19
The Imperial Airways liner Amalthea completed a flight from Moshi, Tanganyika, to the Rand yesterday, a distance of 2,075 miles, in 19 hours, having called at all the usual stopping places on the route. This is a record for a one-day flight on the Imperial Airways service to South Africa.

During the past few weeks Imperial Airways machines have had to alter their route owing to the upheaval in Greece, but an effort has been made to recover on the African section of the flight the time thus lost. Normally the machine is due to reach the Rand on Monday afternoon about 4 o'clock. The Amalthea arrived last night at 10.25. Last week the liner Artemis arrived on the Rand 16 hours late, after having covered 1,605 miles in one day.

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Flight Photo.

[Advt.]

CONTROLLABLE-PITCH AIRSCREWS

Part II. Further Types and Their Operation Reviewed and Explained

By C. M. POULSEN

IT is a somewhat curious fact that although the mechanical problems of the controllable-pitch airscrew were attacked in Great Britain at least as early as and probably earlier than in any other country, the practical adoption seems to have lagged behind, and it is not until comparatively recently that the advantages of the device have been generally admitted, at any rate in its application to certain fairly well-defined types of aircraft.

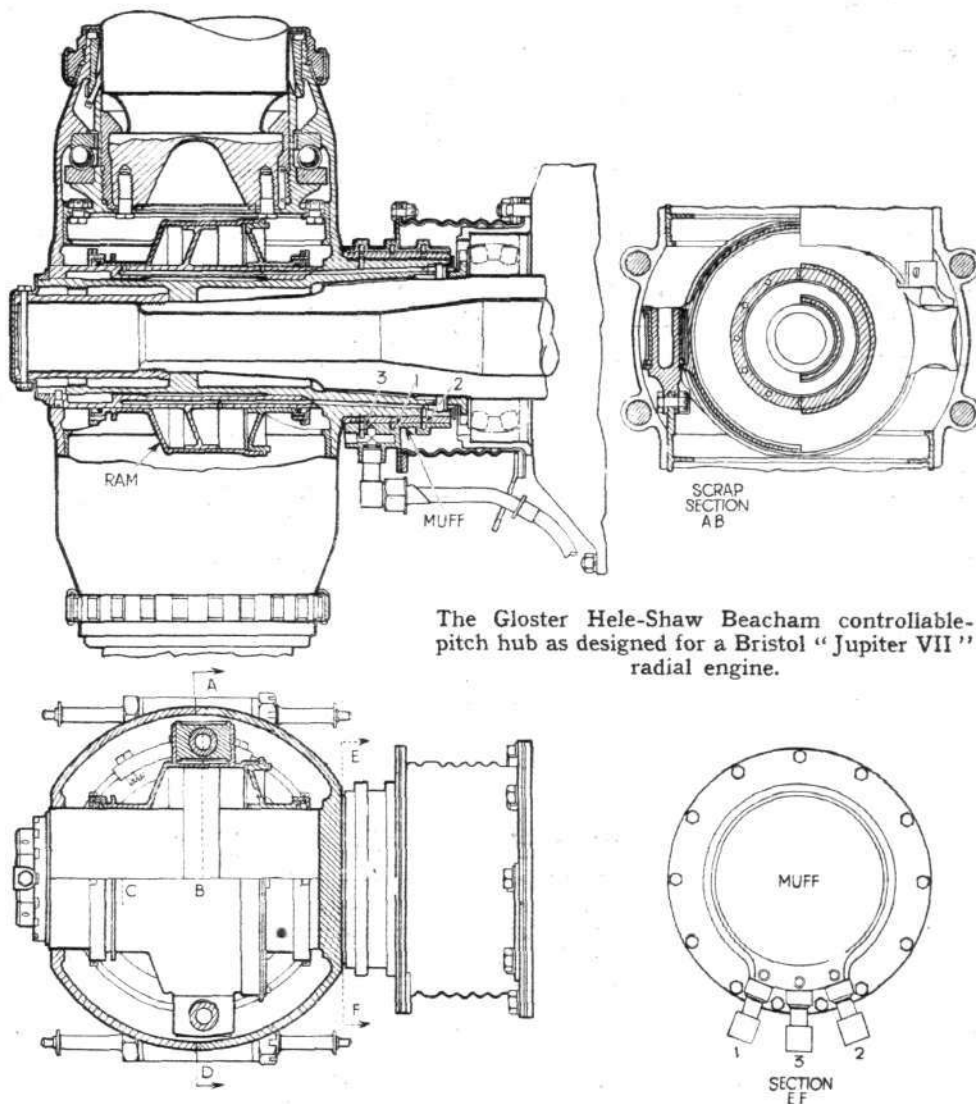
Probably as early as 1924, and certainly in 1925, Dr. H. S. Hele-Shaw and Mr. T. E. Beacham designed a hub for a controllable-pitch airscrew. It was, perhaps, natural that, in view of Dr. Hele-Shaw's connection with the Hele-Shaw Martineau steering gear for ships, the hydraulic principle of operation should be chosen, in which use is made of variable-stroke pumps. The original Hele-Shaw Beacham airscrew design was identical in principle with the hydraulic steering gear, but differed from it in one detail, viz., that whereas manual control was used in the steering gear, governor control was introduced in the controllable-pitch mechanism, thus keeping the speed of revolution of the airscrew constant.

The original Hele-Shaw Beacham mechanism consisted of three units: the hub itself, with its anchorage for the airscrew blades; a variable-stroke pump driven by the engine and providing the pressure necessary to operate the hydraulic ram used for changing the pitch of the blades; and a centrifugal governor, the function of which was to keep the speed constant by setting the blades to the pitch that would give the desired speed. It will thus be seen that this airscrew was not of the "two-position" type which has been the first to become extensively adopted, but was capable of infinite adjustment within its range, and that, moreover, it was entirely automatic in action to the extent that whatever the aircraft was doing—climbing, diving, or flying straight—the engine speed was kept constant by the governor. At the same time the pilot had it in his power to select any speed he desired (within certain limits, of course) so that he could speed-up and obtain extra power for climbing, or "hold down his revs." with the pitch of the airscrew and cruise at full throttle, thereby obtaining better fuel consumption.

An Earlier Model

In 1926 the Gloster Aircraft Co., Ltd., undertook the further development work, and the airscrew became known as the Gloster Hele-Shaw Beacham variable-pitch (or as modern usage has it, "controllable-pitch") airscrew. The pitch of the earlier designs was varied by means of a double-acting hydraulic piston in a casing on the front of the airscrew hub, this piston being secured to a crosshead by bolts. Crank arms on the airscrew blades engaged with lugs on the crosshead, so that as the crosshead was moved forward or back by the hydraulic pressure, the blades were twisted in their sockets in the hub and the pitch altered.

An interesting feature of these earlier airscrews was a centering spring which, as soon as the hydraulic pressure was released, returned the blades to their normal pitch setting. Thus, in the event of the hydraulic pressure failing for any reason, the



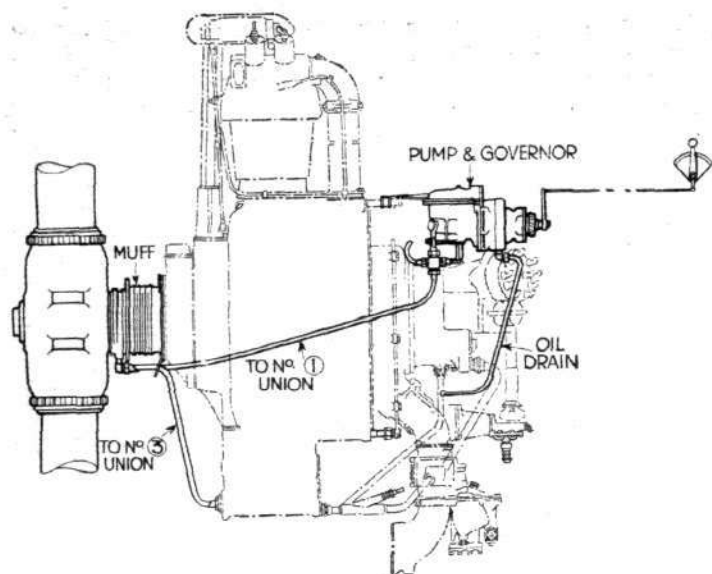
The Gloster Hele-Shaw Beacham controllable-pitch hub as designed for a Bristol "Jupiter VII" radial engine.

airscrew would virtually become a fixed-pitch one. The hydraulic pressure required for operation was necessarily considerable, as it had to overcome not only the forces on the airscrew blades but also the pressure of the spring. In the latest models of Hele-Shaw Beacham controllable-pitch airscrews, the centralising spring used on earlier types has been discarded because, since it had to be strong enough to overcome any twisting moment of the blades about their axis, the operating oil pressure has, in certain conditions, to overcome such twisting moments plus the spring force. It was therefore considered better to allow the blades freedom to set themselves in a position defined by a mechanical stop arranged within the hub, advantage being taken of the fact that any normal blade when running always tends to move to a minimum pitch position.

The External Muff

For the Bristol "Jupiter VI" an external muff was developed, which permitted transmission of the oil pressure from the stationary pipes to the rotating hub. An essential feature of the design was the introduction of a floating bush, which reduces the rubbing speed between adjacent surfaces by 50 per cent., because the bush then runs at half the speed of the shaft. The leakage of oil from one port to another varies as the cube of the clearance, so that for the same power absorption as would occur without the bush it is possible to reduce the leakage with a bush by 75 per cent. Loss of oil through the open end of the muff is avoided by arranging a low-pressure annulus and spiral grooves in the bush near that end.

Special provision must be made to prevent rotation of the muff, yet it must be allowed to line up truly with the projecting boss of the hub. This is achieved by the introduction



The Gloster Hele-Shaw Beacham variable-stroke pump, with governor and pilot's control.

of a thin corrugated flexible coupling. On the "Jupiter VI" the ram had to be carried at the front end of the hub, which entailed much difficult machining. In the "Jupiter VII" hub design certain changes were made which simplified machining operations. The ram was placed inside the hub which surrounds the airscrew shaft (see drawings). Greater flexibility was given to the corrugated muff coupling by increasing its length, it having been found that with the shorter coupling of the "Jupiter VI" there were indications of heavy pressures on the floating bush.

The System

The drawings of the "Jupiter VII" hub are probably mainly self-explanatory. Oil under pressure from the variable-stroke pump is taken through two pipes, 1 and 2, to the muff, whence it is led through oilways to one side or the other of the stationary piston. According to whether the oil pressure is admitted to the front or the back of this piston, the cylinder or ram is caused to move backwards or forwards and in so doing the lugs on the ram carry the cranks on the airscrew blades one way or the other, thereby increasing or decreasing the pitch. The central oil pipe (3) from the muff serves to return the oil to the sump of the engine. The airscrew fitted on the "Jupiter VII," it will be observed, had solid blades.

In the case of the development work done on controllable-pitch airscrews for the Rolls-Royce "Kestrel" engines, hollow steel blades were used, and a slightly different arrangement was employed (see drawings). The principle of operation was exactly the same as that of the "Jupiter VII," but the stationary supply pipes were fed through the hollow airscrew shaft and a rotating oil joint was arranged at the front end. As this was of small diameter no floating bush was required.

The arrangements of the mechanism in the "Jupiter VII" and "Kestrel" drawings are by no means final, and the most recent development work has resulted in certain changes which have improved the running and reduced the possibility of binding almost to vanishing point. That, however, is "another story."

One of the first designers to cater for the requirements of the medium-power aircraft was the French engineer M. Ratier. He evolved a very simple scheme of operation by which two pitch positions were secured, one for take-off and the other (the coarse) for cruising and all other flying. The principle of the Ratier two-position controllable-pitch airscrew lies in threading

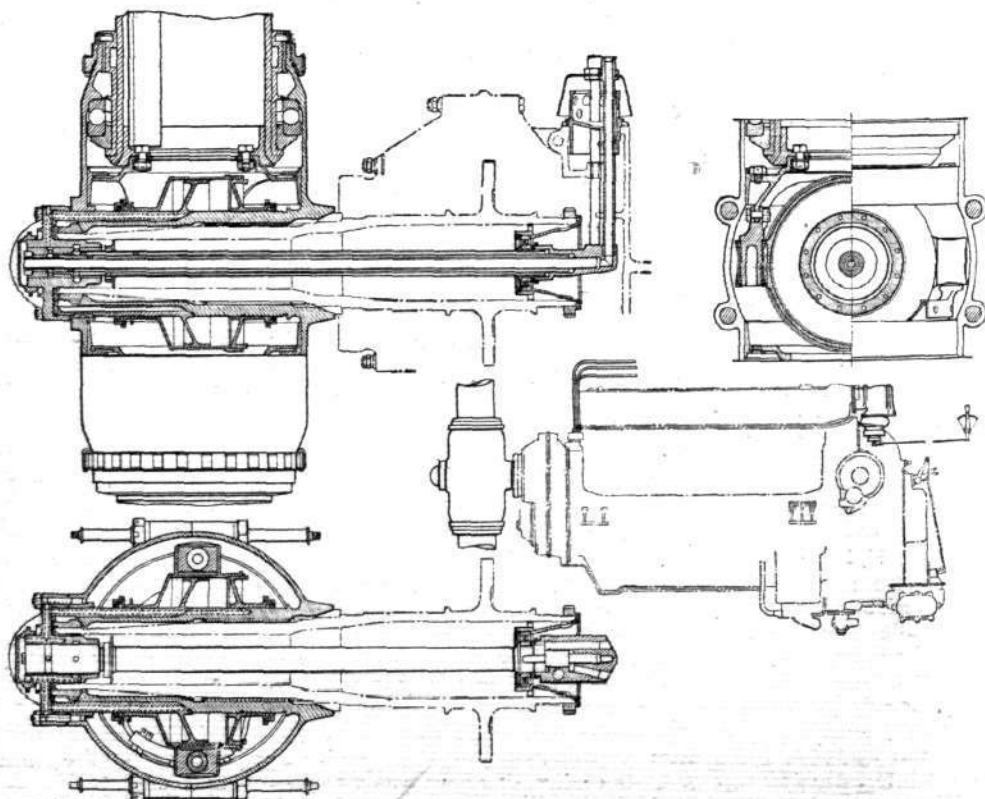
the blade roots into the hub by means of a helicoidal ball bearing, the pitch of this being so chosen that it reduces the force necessary to turn the blades, and the "hand" such as to tend to turn the blades into a neutral pitch position.

The pitch-changing mechanism is extremely simple. In the hollow forward end of the airscrew hub is placed a piston which has projecting backward from its crown a sliding member in which are cut on opposite sides two sloping slots. Working in these slots are the pins of the cranks on the airscrew blade roots. Contained inside the skirt of this piston is a rubber bag. Before a flight, this rubber bag is pumped up by hand. When fully inflated with air under pressure, the bag forces the piston back against the pressure of a spring, and the airscrew blades are brought into the low-pitch position for take-off. When the aircraft has attained a certain forward speed, the flat plate in front of the hub, which is, of course, subject to the dynamic air pressure, slides back under this air pressure and in so doing opens a small air valve which allows the compressed air to escape from the rubber bag. When the bag is deflated the spring forces the piston forward, and, owing to the diagonal slots, the blades are brought into coarse pitch.

Drawbacks

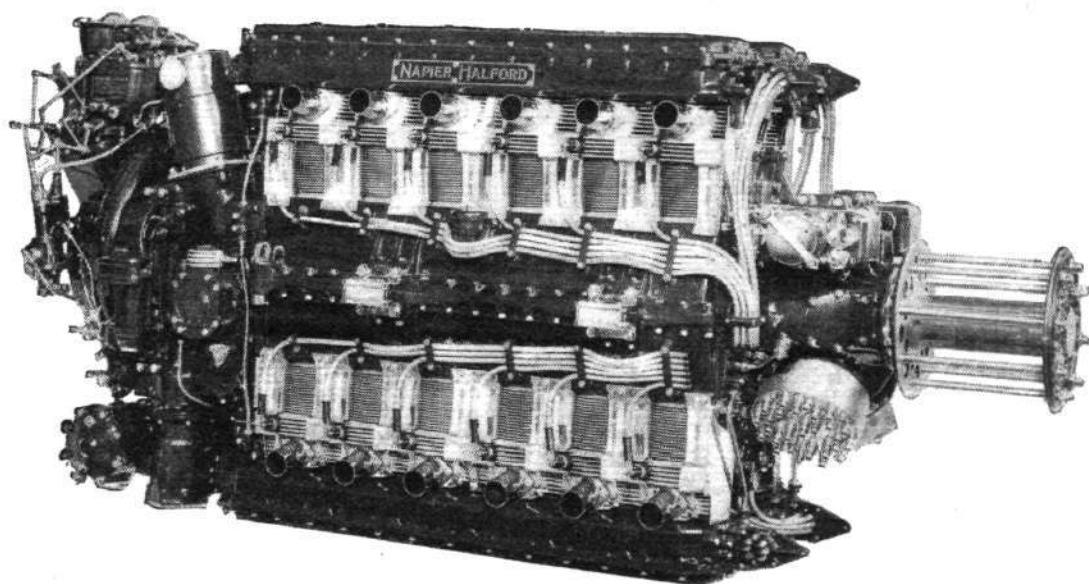
It will readily be appreciated that conditions may arise which would make it very desirable to be able to return the blades to the fine-pitch position. For example, the machine may have taken off and may have attained sufficient speed to bring the airscrew into the coarse-pitch position. A misjudged attempt at landing may call for a burst of engine, and if the blades are in the coarse-pitch position the response of the aircraft will be sluggish, as the blades will probably be stalled at the low forward speed. If the acceleration is insufficient, the aircraft may crash.

M. Ratier well realises these shortcomings of his design, and, in fact, has already brought out an improved model in which springs have been substituted for the air bag. The "hand" of the helicoidal ball bearings on the blade roots has been so chosen that the pull of the blades due to centrifugal force tends to bring the blades into the coarse pitch position. A spring is used, or, rather, a battery of springs, for bringing the blades into the fine-pitch position. As the speed of an aero engine is lower when the aircraft is standing still than when it is travelling along, the centrifugal force on the airscrew blades is comparatively lower at the start than when the machine has gathered a certain amount of speed, and the springs are strong enough to keep the blades in the fine pitch position against the centrifugal pull. As the speed of revo-



On the "Kestrel" engine the stationary supply pipes are led through the hollow airscrew shaft and a rotating oil joint is placed at the front end.

Dagger



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lution increases the pull due to centrifugal force also increases, and ultimately a speed is reached at which the pull becomes strong enough to overcome the force of the springs, and the blades go into coarse pitch. For going back into fine pitch the pilot throttles down, and waits until the engine speed has dropped sufficiently to permit the springs to overcome the centrifugal pull.

It is obvious that while this system may work reasonably well, it is subject to a very nice balance between the strength of the springs and the centrifugal pull, and it is possible to imagine conditions in which high revolutions at fine pitch would be desirable. This appears to be impossible with the Ratier system.

The firm of Pierre Levasseur, specialists in aircraft designed to work with the French navy, has concentrated its attention on airscrew design and manufacture for a number of years. For instance, it was this firm which, many years ago, secured the French rights to manufacture the Reed metal airscrew under licence. The subject of controllable-pitch airscrews has also been closely studied by the firm, and a great deal of experimenting has been done in an effort to discover ways and means of securing wooden airscrew blades to metal hubs. So far the solution has escaped the designers, and of recent years they have concentrated on metal controllable-pitch airscrews.

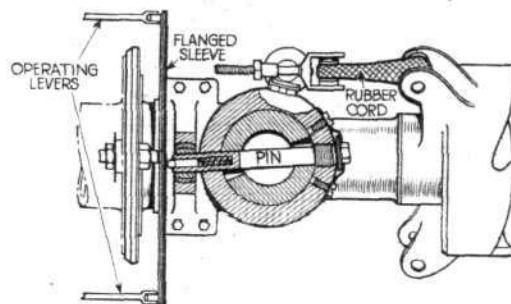
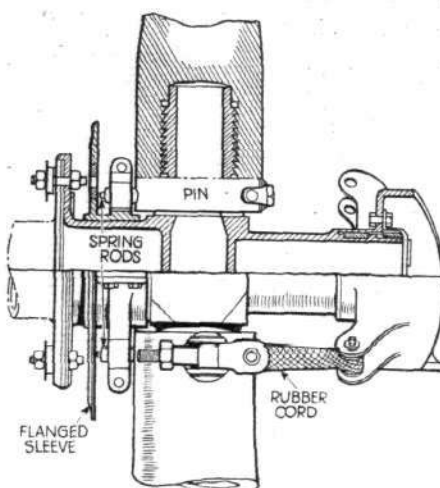
Originally the scheme adopted was to have the roots of the duralumin blades secured in sockets in the steel hub, but this type of construction was discarded, because the heavier metal was used in the greater bulk and the lighter metal in the smaller bulk, so that the construction was found to be rather heavy.

In the modern P. Levasseur controllable-pitch airscrew the roots of the duralumin blades form the sockets and fit over projections on the hub members. This arrangement gives a very light construction and is claimed to have been found to work satisfactorily.

The principle upon which the Levasseur airscrews work is extremely simple. The blade roots have an internal thread machined in them, which engages with the stubs of the steel hub. The pitch and "hand" of this thread are so chosen that centrifugal force tends to twist the blades into a coarse pitch position. At low speeds this tendency is partly resisted by rubber cords anchored to the cranks on the blade roots.

Limits of pitch settings are provided by two pins located

On the P. Levasseur controllable-pitch hub rubber cords are used for returning the blades to fine pitch.



in the walls of the blade roots, and free to swivel in tapering holes in the hub bosses. To ensure that the two blades shall be synchronised as to angular movement, a flanged sleeve is fitted. On this sleeve there are two lugs in which the ends of the pitch-limiting pins engage through ball fittings. The flange of the sleeve has two holes with which two studs on the hub can engage. Spring-loaded plungers in the ends of the pins keep the flanged sleeve in engagement with the studs, but the mechanism can be unlocked by the pilot by forcing the flanged sleeve away from the hub, thus disengaging the studs from the holes. This is done by roller-ended rods bearing on the side of the flange, near the circumference.

At the take-off, when the engine speed is somewhat low, the rubber cords hold the blades in the low-pitch position. When the pilot desires to change into the high-pitch position, he operates the roller-ended rods through a suitable control in the cockpit, disengaging the studs from their holes in the flange of the sleeve, and leaving the blades free to rotate into the coarse-pitch position. For changing into low pitch again the pilot releases the pressure on the sleeve, throttles down until the rubber cords can overcome centrifugal pull, and the blades return to low pitch.

The simplicity of the Levasseur airscrew is attractive, but one suspects that there may be certain practical difficulties connected with the lubrication of the thread if wear on a thread cut in duralumin is to be avoided.

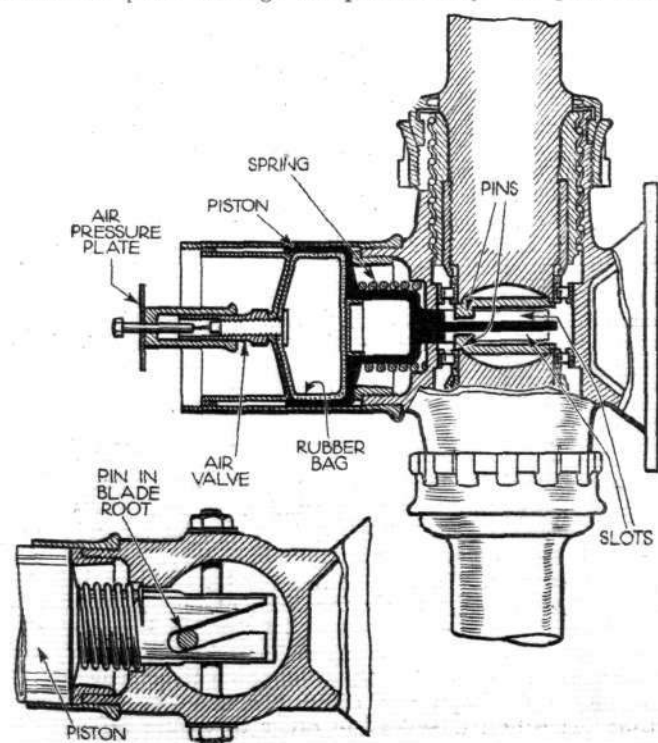
The Smith Airscrew

A controllable-pitch airscrew introduced in America some years ago was the Smith, designed and manufactured by the Smith Engineering Co., of Cleveland, Ohio. Although used by Jimmy Doolittle and Wiley Post on some of their notable flights, this airscrew has never attained as wide adoption as the Hamilton Standard, for example, although its simplicity and the fact that it is variable over a range of angles and not confined to a two-position pitch range would have led one to expect that it had certain advantages.

In the Smith controllable-pitch airscrew the blades are held in sleeves and are operated via worms and worm wheels by another sleeve, a double one, in the thrust bearing cover plate of the engine. This double sleeve passes around the airscrew shaft and does not rotate. It is so arranged that it can slide back and forth along the axis of the airscrew shaft, and by means of an angular-cut groove sliding over a fixed pin. A movement of the sleeve causes either the left or the right-hand worm to engage a horizontal gear, thus transmitting a rotating movement in one direction or other of the airscrew blades. When in the neutral position the gear trains are at rest, so that the only time the operating mechanism is subject to wear is during the few seconds it takes to change the pitch.

Electrical operation of the blades of a controllable-pitch airscrew would appear to offer an attractive solution of the problem, and a couple of years ago such a type was designed by Mr. W. R. Turnbull, a Canadian who came to England during the war. The American rights in this airscrew were secured by the Curtiss company.

In the Turnbull design the aluminium alloy blades are carried in a steel hub. The blade roots have shoulders against which bear the ball bearings that take the centrifugal loads, and bending loads are taken care of by roller bearings near the inner ends of the blades. Each blade has at its extreme inner end a spur wheel which forms part of the pitch-controlling gearing. The electric motor, which is quite small and housed on the front end of the airscrew hub, is geared to these spur



The Ratier two-position airscrew. The inset view shows one of the two sloping slots which, when moved forward or back by the piston, causes the pitch of the blades to change.

wheels at a very low gear ratio. This means that the motor need not be very powerful, and actually one of 12 volts and $\frac{1}{4}$ h.p. is used. This is powerful enough to turn the blades through an angle of 1 deg. in three to four seconds.

One very great advantage of the Turnbull controllable-pitch air-screw is that the blades are rotatable from the lowest pitch that could be desired to a position corresponding to "feathering," i.e., for use on a multi-engined aircraft the blades of an engine that has stopped can be turned "edge on" so that they add practically nothing to the drag.

The Eclipse Aviation Corporation, of East Orange, New Jersey, U.S.A., whose representatives in England are Rotax, Ltd., has brought out an interesting variable-pitch airscrew. This cannot be termed a "controllable-pitch" type, as it is entirely automatic in action, being governed as to pitch-setting not by speed and centrifugal force as some of the others that have been reviewed, but by thrust. The hub is free to slide in a fore-and-aft direction on its shaft, and a battery of springs in front of the hub is used for resisting the forward movement. When the aircraft is standing on the ground, or is moving forward relatively slowly, the thrust is high, and is sufficient to overcome the pressure of the springs. As the hub slides forward along its shaft it puts the blades at a fine pitch via a linkage of normal type. As the forward speed increases the thrust diminishes, and the springs force the hub back, thus causing the pitch to increase.

There are several other makes of controllable-pitch airscrews, but as they all follow in general principle one of those described, it is hardly necessary to refer to them in detail. The Fairey Aviation Co., Ltd., is known to be actively engaged on the development of controllable-pitch airscrews and, in fact, this firm had such an airscrew flying quite three years ago. However, as the production stage has not been reached, it is not permissible to refer to the Fairey in detail.

In conclusion it may be mentioned that although the problem of attaching wooden blades to the metal hubs of controllable-pitch airscrews has proved a difficult one, it does not by any means follow that it is impossible, and development work is still going on which may bear fruit in the not too distant



A Hamilton Standard controllable-pitch airscrew on a British engine. The Bristol "Mercury VI" has been officially approved for use with this airscrew, following 50 hours bench tests and 50 hours flying tests. It is here seen on a "Bulldog."

future. Two British firms are connected with this work, and promising results have been achieved. More than that one cannot say at the moment.

A.I.D. T.S.A. DISCUSSES EXPANSION

Supply of Skilled Inspectors Forms Subject of Speeches at the Tenth Annual Dinner

REFERENCE to the difficulties arising out of the forthcoming expansion of the R.A.F. was made by several speakers at the tenth annual dinner at the A.I.D. Technical Staff Association, which was held at the Holborn Restaurant, London, last Friday. Mr. A. McIsaac, chairman of the Technical Staff Association, was in the chair, and after the loyal toast had been drunk he paid a tribute to the work and personality of the late Mr. J. J. A. Gilmore, recalling that this was the first of the A.I.D. dinners to be held without "John." The company stood silent for a few moments, everyone present thinking of the very good friend he had lost in John Gilmore.

The toast "The A.I.D.," was proposed by Mr. H. J. Thomas, of the Bristol Company, chairman of the S.B.A.C. Mr. Thomas recalled that the first chief inspector, the late Col. Fulton, was a personal friend of his as long ago as 1910. In 1913 the Inspection Directorate was established under Col. Fulton and began operation when the industry was very small indeed. Col. Outram, Director of Aeronautic Inspection, was now starting on one of the biggest peace-time jobs ever tackled. The country was fortunate in having such an able body of men as those of the A.I.D., whose work was, like Cæsar's wife, above suspicion.

In replying to the toast Col. Outram said that to-day the A.I.D. numbered 632. This was an addition of about one hundred in the course of a year. That had not been easy, and it would be even more difficult to find the extra men needed for the coming expansion. The high standards established had to be maintained, and he looked to the members of the aircraft industry to share the burden by increasing their own inspection. With new men at work delays were to be expected, but he hoped there would not be many of those due to the new man who did not know which form to fill up in rejecting a piece of work!

Mr. McIsaac proposed the toast of the visitors, and pointed out that generations to come would find in the annals of the A.I.D. and its early work the names of all those who were the pioneers of a great industry.

Mr. J. S. Ross, Deputy-Secretary of the Air Ministry, and Mr. Dobson, of A. V. Roe and Co., replied to the toast. Mr.

Ross said he felt that in spite of the difficulties connected with the expansion of the R.A.F. they met there that evening in a spirit of quiet confidence. He made the neat point that it was natural to expect that as the R.A.F. expanded so would the industry contract (aircraft manufacturers are "contractors" in Air Ministry parlance). Mr. Dobson referred to a collection that had been made among members of the aircraft industry, and which had resulted in quite a nice little sum being handed over to the council to be devoted to any A.I.D. charity they might select.

A change in the programme was made this year in that, when the official speeches had been delivered, the party vacated the room while the dining tables were removed and small tables substituted, at which groups of friends could meet and talk shop to their heart's content.

Entertainment was provided during the evening by Claud Dampier and Billy Carlyle, Toledo, Elly and Joan, and Gordon Marsh and his Silver Jubilee Cabaret. As usual the arrangements were in the hands of Mr. "Jack" Jarvis, and, again as usual, they were perfect.

Servicing D.H. Commercial Aircraft

Although maintenance work on commercial aircraft is generally carried out by licensed ground engineers, operators often feel that a more detailed schedule would be very helpful in standardising the routine, particularly in the case of the multi-engined machines. In view of this the De Havilland Company has developed a scheme on the lines of one which has been in operation for several years in its Service Department. It comprises a checking card with forty-two items of routine maintenance arranged in the most convenient sequence, thus indicating a thorough and efficient manner of executing the routine inspection aimed at in order to ensure safe and care-free operation.

The Company will be pleased to supply a quantity of these cards to operators of the "Dragon," "Dragon Rapide," and D.H. 86; application should be made to the Service Department at Hatfield Aerodrome, Herts.

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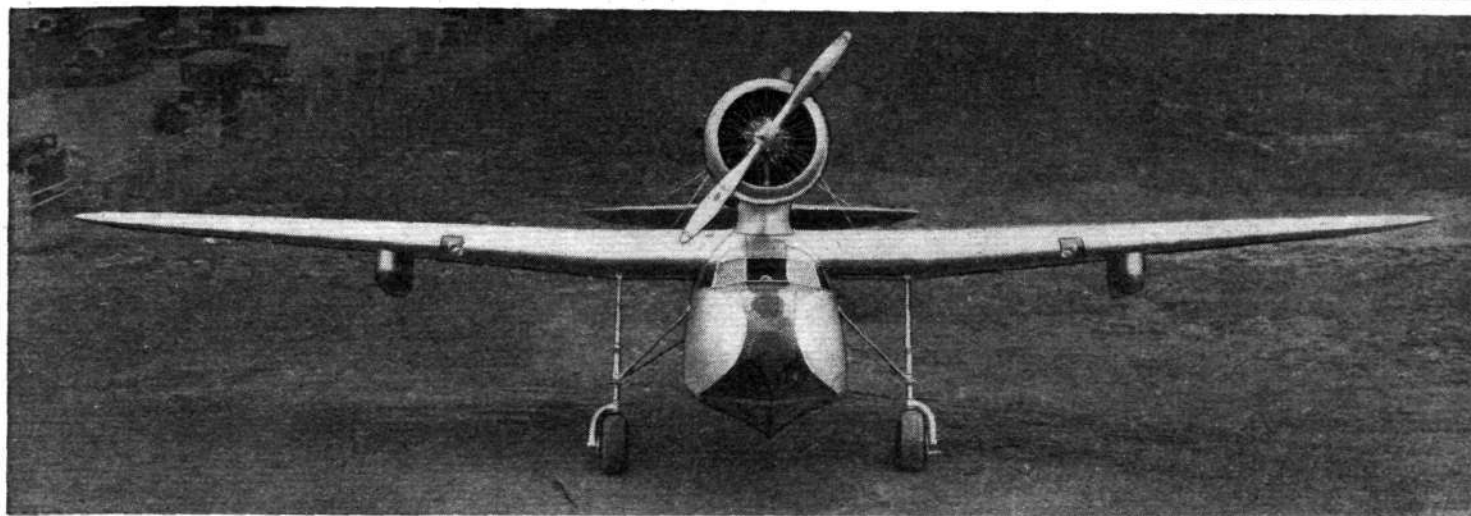
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PAN AMERICAN'S NEW AMPHIBIAN

High Performance and Interesting Construction of Fairchild Monoplane

SIX Fairchild amphibians of a completely new type are soon to be placed in service by Pan American Airways on its route along the Amazon River from Para to Manaos, and in other sections of its system where the adaptability of the amphibian type is desirable. These machines were designed to meet Pan American's specification for a high-speed amphibian using a 650 h.p. engine, with a capacity of eight passengers, two pilots, and 1,000 lb. of mail and/or express goods, and a cruising range of 750 miles. The cruising speed of the new machines is 158 m.p.h. at 3,000 ft. and the maximum 184 m.p.h.

The hull is of the semi-monocoque type, embodying five water-tight bulkheads, and a number of frames of flat sheet formed into Z-sections. These frames are pierced out near the skin to allow the stringers to pass through between the water-tight bulkheads. Duralumin sheet is used for the side stringers, which are of Z-section, but the bottom stringers of the water planing surfaces are duralumin extrusions. A keel former rather than a heavy keelson is employed, the water loads being carried by the frames and bulkheads into the side skin. The chine spray strips, which are of duralumin extrusions, are actually structural members of the hull.

The Wing

Riveted to the hull is the centre section of the cantilever wing. It is of two-spar construction, and carries two fuel tanks of 180 gallons total capacity between the spars. The outboard panels are detachable, and also embody two spars, with thin sheet webs and flanges of duralumin extrusions. The top covering of the wing is in two layers, the inner one with corrugations running parallel to the spars, and the outer one of flat sheet riveted to these corrugations. By utilising the lower flange of the front spar as a rail for the undercarriage retracting trolley, a great deal of weight has been saved. The rear spar of the centre section does not run straight through the hull, but curves above it. Metal covering is used for the leading edge of the wing, but the trailing edge is fabric-covered.

Metal-framed ailerons are used, statically and mass-balanced by lead weights carried on arms projecting forward from the hinge line and enclosed in the wing at all except large "up" aileron angles. The trailing-edge flaps are attached by slide fittings at their leading edges, and links close to their trailing edges. They are actuated by cables which are wound round a grooved drum in the hull and attached to the flap slide fittings, which move fore and aft on slide tracks upon the rear spar.

All surfaces of the *empennage* have duralumin frameworks and fabric covering, with the exception of their nose pieces, which are covered with duralumin sheet beneath the fabric. Both fin and tailplane are braced to the hull by streamlined tie rods, and all control surfaces embody trimming "tabs."

The undercarriage and tail wheel retract simultaneously, the landing gear structure being so designed that the wheels fold rearwards and upwards, rotating slightly around the axis of the shock absorbers, so that they lie flush with the under-surface of the wing when retracted. A spindle installed within the front spar flange operates a trunnion on the wheel trolley. When turned, this spindle causes the trolley to move inboard

or outboard. The tail wheel retracts into a well on the underside of the hull aft of the second "step."

By means of a parallelogram arrangement of struts the wing floats retract against the underside of the wing. A spindle and trunnion mechanism is used. A recess is provided between the spars, so that the float bracing struts are fully concealed within the wing, and a metal panel, attached to the outer struts, hides the entire float mechanism when the floats are retracted.

Only one hand crank, one motor and a gear box are used to divert the driving power to the landing gear, flaps or floats, one at a time, when required. An electrical system, with hand cranks for emergency use, is employed.

Welded chrome molybdenum steel tubing is used for the nacelle structure, which is carried above the wing. It is attached to the centre section at three points—at the rear spar, and at two points on the front spar. The engine—a Pratt and Whitney "Hornet S4D1," giving 650 h.p. at 2,050 r.p.m. at 3,000 ft.—is supported by means of rubber bushings which allow it to move slightly in the direction of torque, but not in the fore and aft direction. An N.A.C.A. cowling is used. The rear portion of the nacelle can be used for storing baggage or equipment, while its forward portion houses the oil tank, oil cooler, engine controls and accessories.

The first compartment of the hull, in the extreme bow, is employed for the storage of the anchor and other marine equipment. Aft of this is another compartment utilised for the stowage of baggage, mail and cargo, and accessible from the deck through a hatch. A water-tight door leads to the pilots' cockpit which is immediately behind, and is fitted with dual controls. The engine controls and electrical switches are attached to the roof, and the selecting lever, switch and hand crank for the retracting mechanism gear box are installed between and above the two seats.

From the pilots' cockpit a water-tight door leads to the central cabin which has four adjustable chairs. A shelf near the cabin ceiling on the port side is used for the storage of lifebelts, and a companion shelf on the opposite side is used for stowing parcels. An emergency exit hatch is provided in the ceiling and leads on to the centre section of the wing. Another water-tight door leads to a second cabin which also has four chairs. Entrance and exit are made through a hatch door to the rear of the second cabin *via* a folding ladder on the outside of the machine and a fixed stairway within the cabin. The space opposite the stairway can be used for the storage of baggage. To the rear of the cabin is a toilet compartment with wash basin, mirror, etc. Each cabin has four large windows of shatter-proof glass and two electric dome lights. Ventilation and heating is effected by ducts which run alongside the upper part of the cabin walls, and the cabins are sound-proofed in accordance with the latest practice. The leading particulars of the machine are:—

Dimensions.—Span, 56 ft.; length, 46 ft.; wing area, 485 sq. ft.

Weights.—Weight empty, 5,500 lb.; gross weight, 9,600 lb.

Loadings.—Wing loading, 19.78 lb./sq. ft.; power loading, 14.76 lb./h.p.

Performance.—Maximum speed (sea level), 179 m.p.h.; maximum speed (at 3,000 ft.), 184 m.p.h.; cruising speed (85 per cent. power), 158 m.p.h.; absolute ceiling, 20,000 ft.; stalling speed (without flaps), 68 m.p.h.; stalling speed (with flaps), 58 m.p.h.; range at cruising speed, 750 miles; take-off time (land), 16 sec.; take-off time (water), 36 sec.

HERE AND THERE

News of the Latest Developments in the Aeronautical World



Straight lines lend an air of distinction to this new two-seater B.A. "Swallow," which, as described below, has a remarkable speed range. (Flight photograph.)

An Amazing Speed Range

THAT straight lines and aerodynamic efficiency can go hand in hand seems to be proved by the new "Swallow," which the British Aircraft Manufacturing Co., Ltd., of Hanworth, has recently introduced, and which was shown in public for the first time at the R.Ae.S. garden party last Sunday. The wing tips, the trailing edge of the rudder and elevators, and the sides and top of the fuselage all show straight lines in their layout, and yet the machine has a performance which can only be described as amazing. Fitted with a Pobjoy "Cataract II" of 85-90 h.p., the new "Swallow" has a maximum speed of at least 110 m.p.h., or probably a little more, cruises at 95-98 m.p.h., and lands at about 25 m.p.h. It will stay in the air, in horizontal flight, at about 30 m.p.h., and it was amazing to see it on Sunday, with engine stopped, floating about over the aerodrome as if it were a sailplane and not a power-driven aircraft. To achieve such performance and such control purely by the aerodynamic design (the machine has no slots, flaps or similar "modern" adjuncts) proves most distinct merit, and the "Swallow" should become a very popular aircraft, as it appears to share with previous two-seaters of the family a considerable ease of handling.

The construction remains preponderatingly of wood, but the lines of the machine have been changed and a new improved undercarriage has been added. By using double walls in the sides of the fuselage, the cockpits have been made very neat and tidy, without awkward corners to collect dirt and dust. Needless to say, dual controls are provided.

For a tare weight of 998 lb., the maximum permissible loaded weight is 1,500 lb., and tankage is provided for a range of 420 miles, or approximately four and a half hours.

Fire Extinguishing by Carbon Dioxide

At Hanworth last week, a demonstration of the "Lux" system of fire extinguishing was organised by Chamier, Gilbert

Lodge and Co., who are handling the distribution of this equipment in the aviation world.

The "Lux" system utilises pure carbon dioxide gas which is stored, in its liquid form, in steel cylinders, and is discharged through a length of hose and a funnel-shaped nozzle. It discharges as a cloud of mixed gas and fine carbon dioxide "snow" which is intensely cold. The fire is extinguished by reducing the oxygen content of the air below the point at which combustion is supported and the "snow" has great cooling properties.

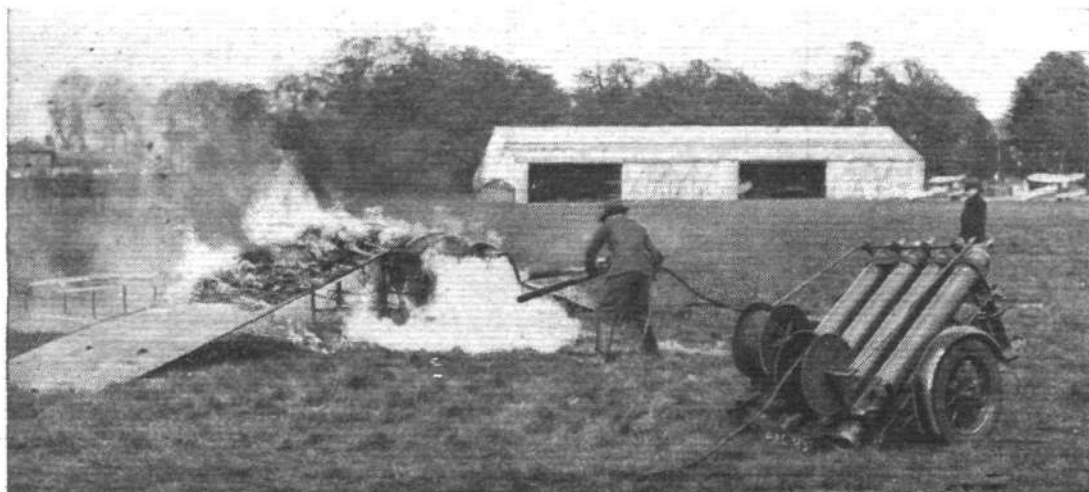
The carbon dioxide is non-injurious to life or material. A prolonged immersion in a concentration of the gas will, of course, eventually cause "drowning" due to shortage of oxygen, but there is no toxic effect.

A petrol fire in a tray measuring 6ft. x 2ft. (and incidentally nearly the same area again of burning grass) was quickly extinguished at Hanworth. Then a perforated bucket was placed about 2ft. 6in. from the ground and filled with petrol. The subsequent fire on the ground, in the bucket, and falling in streams from the bucket, was successfully extinguished. Later an old aeroplane fuselage and two wings were placed on the ground to represent a crashed machine. About ten gallons of petrol was poured over the fuselage and on the ground and then ignited. The fire was tackled with a trailer equipment carrying four cylinders of 50lb. capacity ejecting through two nozzles, which extinguished the blaze in a few seconds.

The equipment is manufactured by The Walter Kidde Co., Ltd., Montague Avenue, Hanwell, London, N.7.

Oil for India

The Director of Contracts, Army Headquarters, India, has accepted the Vacuum Oil Company's tender for "Aero Mobiloil Red Band" for the lubricating oil requirements of the Royal Air Force in India. "Aero Mobiloil Red Band" is the name that has been given to the "Clearsol"-processed oil to be marketed in place of Mobiloil "Aero W."



The "Lux" fire-fighting equipment, which employs liquid carbon dioxide, is here seen in action on a "crashed" aeroplane at Hanworth. The "snow" is intensely cold, but it is possible to hold it in the hand provided it is kept constantly on the move. Otherwise frostbite will result. The apparatus is described above. (Flight photograph.)

A Nautical Autogiro

That a C.30 Autogiro is soon to be taken on board H.M.S. *Courageous* was announced in *Flight* last week. Since that date one of these machines—presumably that for the *Courageous*—has been at Hanworth, where it was fitted with flotation gear.

This gear consists of two cylinders which are carried parallel to the fuselage on two under-carriage struts. These contain bags which are inflated—should the machine be forced to alight on the sea—by liquid carbon dioxide, which is converted into a gaseous state when exposed to the air. This system of employing carbon dioxide gas to inflate flotation bags is employed on several service types which have to operate from aircraft carriers, or whose duties carry them over water. Therein, by the way, lies the explanation of the two queer excrescences carried beneath the top planes of the "Harts" of certain R.A.F. Squadrons. These contain the flotation gear used when the machines are employed for dive bombing over water.

The gear which equips the Autogiro has been developed by the Cierva Autogiro Company, Ltd., the Walter Kidde Company, Ltd., and the R.F.D. Company, Ltd., in collaboration.

Water wings: the Autogiro with its flotation gear.

Ordeal by Air and Water

After the Saunders-Roe "Saro" A.27 flying boat had completed arduous acceptance and service trials recently, involving some 300 hours' flying, the two Bristol "Pegasus III" engines were dismantled from the machine and returned to the Bristol works for examination.

From an engine viewpoint the nature of these extended trials was particularly arduous and included full-load climbs, full-throttle level speed trials at different heights, single engine trials, tests in rough water, and long endurance tests. In addition, the engines were exposed throughout the trials to the corroding effects of spray and salt-impregnated atmosphere. Throughout the entire 300 hours' running the engines had given the fullest satisfaction.

On stripping down the internal condition of both engines was found to be very good, particularly as fuel to specification D.T.D.230, having a high lead content, was used throughout the trials. Pistons, rings, cylinder bores, valves and valve seats were all in excellent condition, and only replacements of an incidental character, such as washers, split pins, gaskets, felt rings, etc., were found to be necessary.

Incidentally, the "Saro" A.27 boat fitted with Bristol "Pegasus" engines is now in quantity production for supply to the Air Ministry.

Shipbuilders as Aircraft Constructors?

It is reported that Harland and Wolff, Ltd., the famous Belfast shipbuilders, are considering the question of aircraft construction. Asked by a shareholder at the annual meeting in London last week to confirm or deny the rumour, Mr. F. E. Rebbeck (chairman) replied that he could not answer "Yes," but would certainly not say "No."

He said that it was not generally realised that during the war the firm built a thousand aeroplanes. They still had the factory and they still had the operatives; in addition, they had an aerodrome right at the back door of the factory.

He added that if there was anything to be gained for the shareholders from the building of aeroplanes they would certainly do it. It seemed to him that, having regard to the unrest all over Europe, it would be rather remarkable if in the ordinary course of events they did not manufacture something which they were fully qualified to manufacture.

Solo Across the South Atlantic

An ambitious long-distance flight, involving the crossing of the South Atlantic, is to be made within the next week or so by a Spanish pilot using a British light aeroplane. The pilot is Señor Juan Ignacio Pombo, and the machine is an "Eagle" constructed by the British Aircraft Manufacturing Co., Ltd. Señor Pombo intends to make his 9,000-mile flight from Santander to Mexico City via Madrid, Seville, Las Palmas, Port Natal, Venezuela and Colon.

The normal cabin arrangements of the three-seater "Eagle" have given way to extra fuel tanks, which will extend the range



to no less than 2,600 miles. Later the pilot intends to make a return flight.

The machine has been named *Santander*, and the christening ceremony was performed at Hanworth last week by the wife of H.E. the Spanish Ambassador (Don Ramon Perez de Ayala). The Mexican Minister (Señor Javier Sanchez-Mejorada) was also present, together with the President of the Spanish Club in London and about a hundred members of the Spanish colony representing various clubs and institutions. Air Commodore P. F. M. Fellowes, D.S.O., a director of the British Aircraft Manufacturing Co., Ltd., presided.

Great interest is being taken in the flight among the Spanish people, and it is being financed nationally.

Señor Pombo is only 21 years old, but he has been flying since the age of 15; he comes of a flying family—his father holds the first Spanish "A" licence, and his brother is the country's youngest pilot.



Señor Pombo (left), who, as recounted in the accompanying paragraph, is shortly to fly the South Atlantic in a B.A. "Eagle." He is seen with Don Ramon Perez de Ayala, the Spanish Ambassador, and Señora de Ayala, before the christening of the machine at Hanworth.

Here and There (contd.)**A Notable Engine Passes Its Type Test**

Recently the Bristol Company completed an extremely satisfactory 100 hours official type test on a new series of "Pegasus" engine, the outcome of fourteen months' intensive development work started upon almost immediately after the "Pegasus III" engine was put into production in the autumn of 1933. This engine, known as the "Pegasus X," is of the moderately supercharged type and of the same volume and layout as the "Pegasus III," which it is intended in due course to replace. It is designed to run on D.T.D.230 (87 octane) fuel, and standard D.T.D.109 oil.

The Bristol "Pegasus X" has a remarkably high performance and low weight/power ratio. It is considered as one of the most outstanding of aero engine design and production achievements, and it is believed that it is one of the lightest production-type aero engines for its power in existence.

Externally, it is similar to the present "Pegasus" series, but it has a number of detail improvements, including redesigned and lightened reduction gear; the standardisation of the Hamilton controllable-pitch airscrew, together with integral oil valve for its control; new and improved cylinders with substantially increased finning; strengthened connecting rods made in a new and improved material; improved master-rod floating bush bearing; modified and improved blower; sodium-cooled and stellite exhaust valves and stellite valve seats; new interchangeable cone mounting with rubber shock damping attachment; new combined cowl and exhaust ring of riveted stainless steel construction mounted on rubber; and automatic mixture control.

The official figures taken during the type test are as follow:

Take-off power at 2,250 r.p.m. normal ...	920 b.h.p.
Normal power at 3,500 feet ...	820 b.h.p.
Maximum power at 6,000 feet ...	875 b.h.p. at 2,600 r.p.m.
Weight ...	995 lb. net, dry
Weight/power ratio ...	1.08 lb. b.h.p.

The average endurance powers for the 100 hours type test were 90 hours at 2,250 r.p.m. (888 b.h.p.), 9 hours at 2,140 r.p.m. (710 b.h.p.), and the last hour at normal r.p.m. rated boost, at an output of 795 b.h.p. The average oil consumption throughout the test was 10.1 pts./hr.

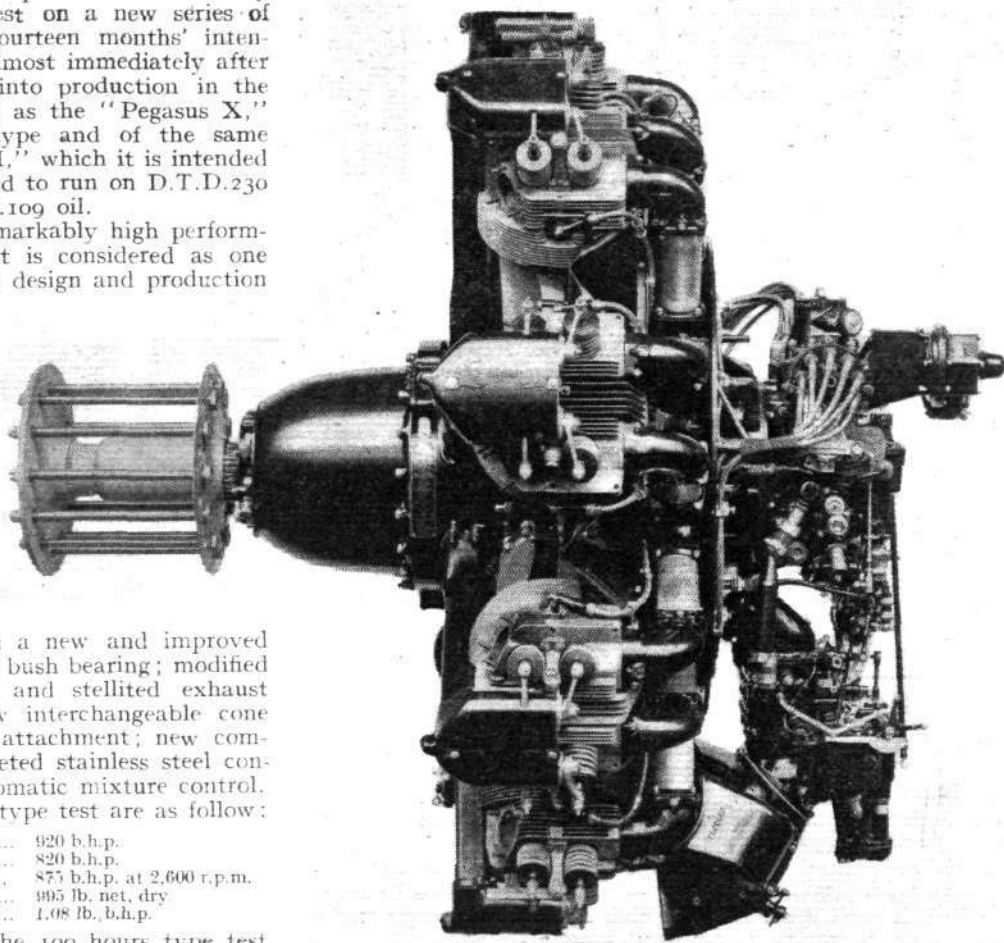
The first production series batch is already in hand for delivery in the autumn for prototype aircraft, and full quantity production at the Bristol factory will be in operation in the spring of 1936.

A Compressed-Air Undercarriage Leg

A new type of landing leg, which can be produced to suit all types of aircraft, has been introduced into Great Britain from Germany, where it first appeared a few years ago. It is now very widely used in that country, and among notable machines to which it is fitted are the Heinkel H.E.70, and the Junkers Ju.52. In this country the leg is being manufactured by Turner's Motor Manufacturing Co., Ltd., of Wulfruna Works, Lever Street, Wolverhampton.

Great advantages are claimed for this compressed-air leg. Air being a compressible medium landing shocks are, it is claimed, imparted progressively to the undercarriage, and big reactions on landing are avoided. The saving in weight over several other types of compression leg now in use is stated to be considerable. The air in the leg is unaffected by temperature, and machines utilising it can be operated from aerodromes at high altitudes without their landing qualities being adversely affected. It is possible to mount the leg in any position—even, if required, inverted.

The action of the system employed is as follows: Landing energy is absorbed on the compression stroke, and rebound energy on the return stroke. The leg is filled with compressed air from a pump or air bottle through a valve mounted on top of the leg and a piston is forced downwards by the air, until a predetermined pressure suitable for the particular aircraft is reached. During a landing the first movement on the compression stroke compresses the air in an upper cylinder. As the piston progresses, and the pressure increases, the force overcomes the spring behind a valve, and the air is free to flow through the piston into an annular space behind it. Energy is absorbed during this operation both through the air passing through suitable-sized orifices, and by the turbulence created. When the energy of the first landing shock is completed, the very high pressure acting on the piston head returns it to its original position. To accomplish this, it has



The Bristol "Pegasus X" develops 920 b.h.p. for take-off and weighs 995 lbs.

to displace the air which has been forced into the annular space round the piston rod during the compression stroke. The mushroom valve is closed by this returning air, which can flow back only through one small hole in the valve. This restriction on the return stroke has the effect of absorbing energy and damping out vibration. The size of the aperture can be varied to provide suitable shock-absorbing qualities for different types of aircraft.

Maintenance consists in ensuring that the packing which serves as a seal between the piston and cylinder does not become dry. The strut requires additional air about once every two months, due to a certain loss of air when it is being filled with oil for lubrication purposes.

MODERN BRITISH AIRCRAFT**Special Pictorial Supplement in *Flight***

PUBLISHED two days before Empire Air Day, when military and civil aerodromes all over the country will be opened to public inspection, the issue of *Flight* for May 23rd will contain a special pictorial supplement depicting Modern British Aircraft.

Handsomely reproduced from *Flight* photographs and annotated with the leading particulars of each machine, this feature will show representative examples of each type of civil and military aeroplane, and, for those not fully acquainted with their appearance, will form a valuable guide to the machines that will be seen on Empire Air Day (May 25), the Hendon R.A.F. Display (June 29), the Royal Fly-Past at Duxford (July 6) and other important events.

In addition, this issue of *Flight* will include special articles detailing developments which, during the past twenty-five years, have contributed to the present high standard of British Aircraft.

THURSDAY

FLIGHT

MAY 23rd.

THE DRAGON RAPIDE

TWO 200-H.P. GIPSY-SIX ENGINES



"Flight" photograph

as supplied to

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by

THE DE HAVILLAND AIRCRAFT CO., LTD.

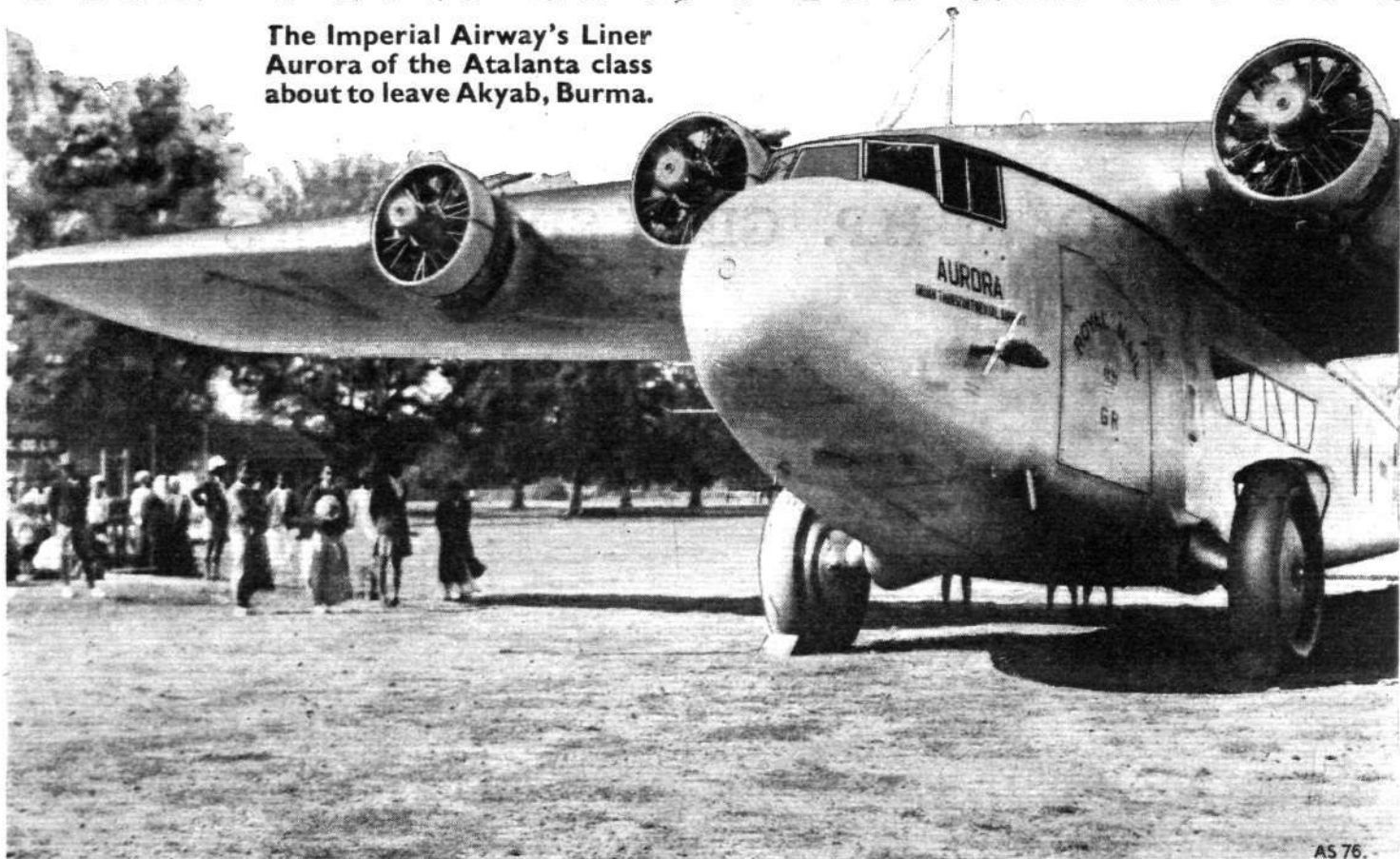
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Here and There (contd.)**A Revolutionary Constructional Process**

A constructional process that promises to bring about a minor revolution in motor and cycle manufacture, and which, by its nature, is of great interest to aircraft constructors, is announced this week.

Briefly, it is a method of jointing light aluminium alloys, such as R.R.56, without that danger of injury to the metal which is involved in welding processes.

A metallurgical engineer of Coventry, Mr. H. Shortland, has succeeded in producing a new jointing material called "Alusol" as the result of many years' research. This material possesses most promising characteristics, and will, it is said, join aluminium in cast, rolled, sheet or tube form, Hiduminium, Duralumin or Birmabright, with a strength equal to that of the unjointed material. A representative of *The Autocar* has seen test pieces of R.R.56 tubing, which is unimpaired by the temperature of the process, socketed one into the other, joined with "Alusol" and then pulled on the tensile testing machine. The tube pulled at 26 tons per sq. in., leaving the joint intact. It is claimed that the material "Alusol" withstands corrosion well, as the result of a special process used in its manufacture, and is not affected by ageing.

The Reynolds Tube Co., Ltd., Birmingham, who recently have put down a most modern plant for drawing of R.R.56 tube and other sections, found the preliminary testing of the new jointing material so encouraging that they immediately set about the experimental production of an all-light-alloy bicycle.

The method of using "Alusol" is quite simple, and is analogous to soldering, except that no flux of any kind is required. It is understood also that an aluminium tube can be fastened into a steel bracket by this process, if the steel bracket surface is first tinned with soft solder, and that such a joint will stand a pull of approximately six tons per sq. in. Alusol is made by the Coventry Aluminium Engineering Products Co., High Street Chambers, Coventry.

A Very Thin Deutsch Cup Contest

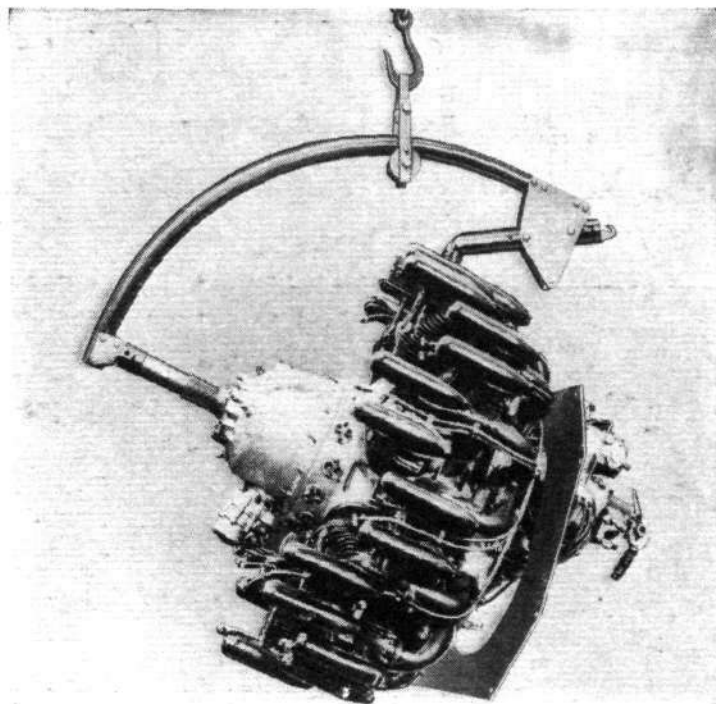
Owing to lack of time for effecting final adjustments four of the machines entered for the Deutsch Cup Race were unable to make their trial flights before 8 p.m., on Thursday, May 2, as required by the regulations, and so consequently cannot compete in the contest on May 19.

The two Caudrons, equipped with the new Renault eight-litre engines, which were expected to produce 500 h.p. and were especially designed for this race, could not be made ready in time. The two Regnier six-cylinder engines, which gave 350 to 375 h.p. on the bench, and were to power a Nering and a Caudron respectively, also awaited final adjustments, and this, together with the fact that the Nering was not ready, also rendered it impossible for these two entries to qualify.

When it was seen that their two new 1935 machines would not be able to qualify in time the Caudron Company immediately replaced them with two other entries—the machine with which Maurice Arnoux won the Deutsch Cup Race last year and a two-seater "Rafale" tourist-type machine, converted into a single-seater for the Michelin Cup contest last autumn.

The six-cylinder-in-line inverted air-cooled Renault engines, rated last year at about 300 h.p., have had their r.p.m. slightly increased and their compression raised, which is said to give them about 20 h.p. extra.

R. C. W.



The new Vickers lifting tackle, described below.

Engine Handling Made Easy

All who have had anything to do with the overhauling of aero engines, radials especially, know only too well the porcupine-like difficulties which they present in handling, unless special equipment is available.

The Vickers patented "Bent Beam" lifting tackle, illustrated above, completely disposes of the old cable tackle, consisting as it does of a large-diameter tube bent to a radius struck around the c.g. of the engine, with a single grooved pulley and suitable straps and attachments. It is particularly suitable for the Bristol "Pegasus" engine, but it is also readily attached to an Armstrong Siddeley "Panther" engine, where the lifting eye is in front of the cylinders as opposed to the rearward position of the eye on the "Pegasus."

From the examination of the illustration the advantages of this tackle will at once become apparent to those accustomed to handling such engines. It is possible to move the engine to any position on the curved beam by pressure of the hand, in which position it will remain without any tendency to run back. The advantage of being able to sling the engine at any angle will be fully appreciated when the necessity arises to install the engine in an aeroplane with the tail resting on the ground.

Another interesting Vickers accessory is a special light portable engine stand developed in conjunction with the "Bent Beam" and capable of accommodating the "Kestrel" and similar engines, as well as radials.

This stand, which is on a wheeled trolley, has been primarily designed as part of the breakdown equipment for stowing in aircraft. It is collapsible and occupies a minimum amount of space.



A DIRECTORIAL GESTURE: The handsome new clubhouse presented by Mr. A. S. Butler, chairman of the De Havilland Company, to the D.H. Sports Club on Saturday last. Mrs. Butler presented prizes to the winners of sports held on the same day.

FLYING ON 250 c.c.

Villiers Two-stroke Motor Cycle Unit as "Occasional Engine" for a Sailplane : The Outcome of a Startling but Practical Scheme Conceived by Sir John Carden



Puzzle—find the power unit! No one would suspect that an auxiliary engine is tucked away within the fuselage of the Carden-Baynes sailplane.

SEVERAL attempts have been made from time to time to combine the glider or sailplane and the power-driven type of aircraft in one machine. Many of the ultra-light 'planes which took part in the Lympne competitions some years ago were virtually gliders with small motor cycle engines fitted. Although these machines were remarkably efficient, regarded as aeroplanes, they did not achieve L/D ratios comparable with those which the modern type of sailplane attains. The very fact that the engine and airscrew were exposed to the airstream increased the drag very materially and reduced the efficiency from the sailplane point of view.

With a pure and simple glider, on the other hand, a very high L/D ratio is achieved by having a very large wing span, so as to obtain low span loading with consequently low induced drag. To get into the air such a machine must, however, be launched either by a ground crew catapulting it off by means of rubber cords, or by towing behind a motor car or an aeroplane. It is often possible, if a height of some hundreds of feet can be attained initially, for such a machine to reach a region where strong up-currents exist, and by making use of these the pilot can often make cross-country flights of considerable duration.

If the sailplane gets out of one up-current, however, it may not be able to reach another before it has lost too much height, and will then have to land. In most cases this means that the pilot has to telephone back to his starting point, and a car with a trailer has to be sent out to find him and bring him back. All this is something of a handicap to the sailplane pilot, and if means can be found to enable him to regain his base without outside assistance his independence would be vastly increased, and, moreover, he would probably be able to put in many more flights in the course of a day.

Sir John V. Carden, who has been a keen amateur pilot for a good many years, and who has owned several aeroplanes (his present mount is a Miles "Hawk"), has had the brilliant idea of utilising an "occasional" power plant; in other words, his engine is ordinarily mounted in a position out of the airstream; but when it is wanted, either to get the sailplane off the ground initially, or for reaching a region of up-currents, it can be put into operating position and started, the machine then proceeding as an ordinary low-power aeroplane.

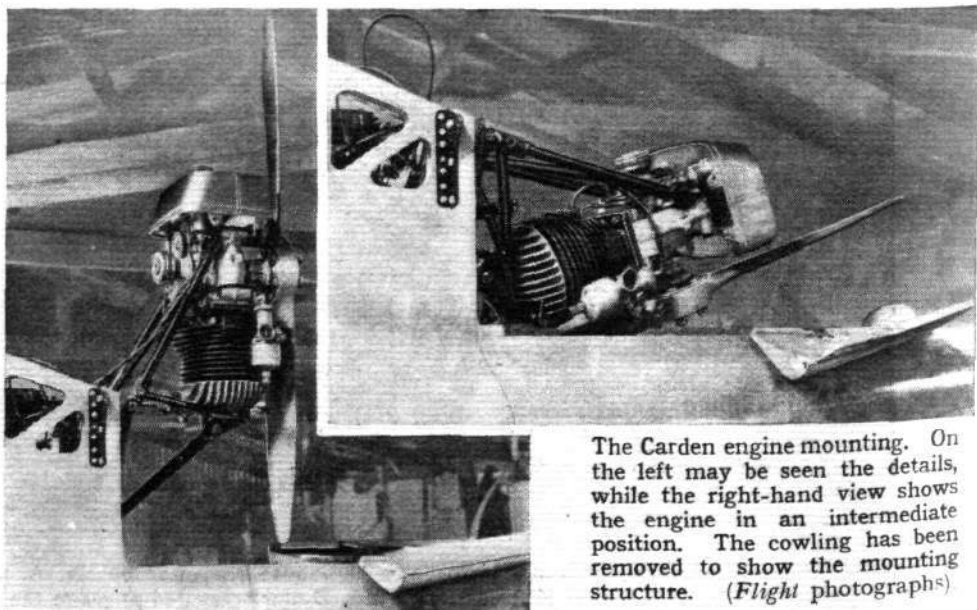
It might have been thought that to do this would have been a very difficult task. Sir John has, however, schemed out an amazingly neat and simple method. In his work he has had

the whole-hearted co-operation of Mr. L. E. Baynes, the designer of the very successful "Scud" sailplanes, and of the Villiers Engineering Co., Ltd. Mr. Baynes has designed for this extremely interesting development a new high-efficiency sailplane which has been constructed at the Abbott Motor Works, Wrecclesham, Surrey, where *Flight* last week had an opportunity of inspecting the new craft.

Engine Reliability

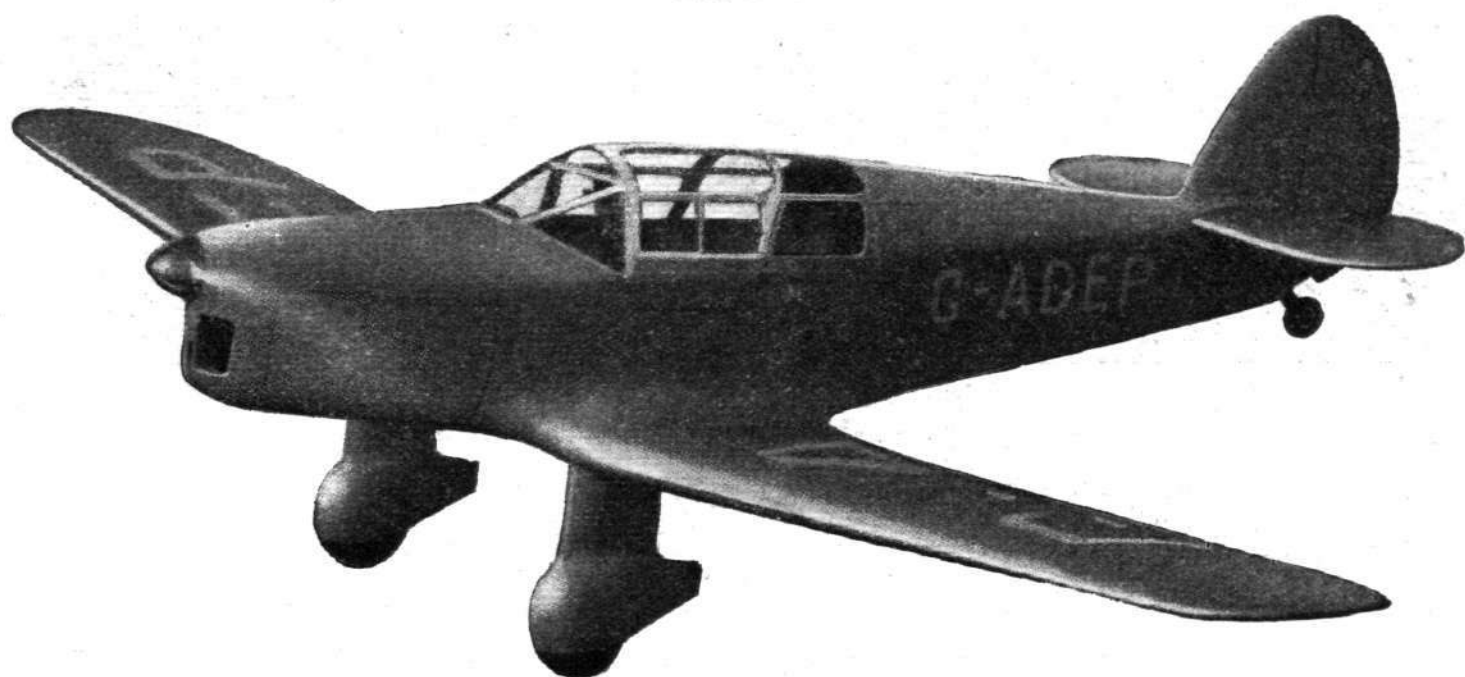
The engine which Sir John Carden is using is a single-cylinder Villiers two-stroke of 249 c.c. capacity. In its normal form this engine is, of course, an ordinary motor cycle engine with its cylinder pointing upwards. For the sailplane it was desired to invert the engine, since by doing this the centre of the crankshaft would be raised, thus giving the necessary airscrew clearance with very small overall height. The Villiers Company very sportingly undertook the work of converting the engine, and the tests which Sir John has had carried out at Wrecclesham have been extremely satisfactory; the engine has run for many hours on end at full throttle without any trouble and without any signs of overheating, the cowling being so arranged that it forms a venturi, while the airscrew blades passing close behind the cylinder help to produce a very strong air current.

The mounting of the engine is very simple. Two tubes having a diagonal bracing member run to the crank case and vee tubes to the cylinder head, so that the whole system is perfectly triangulated and a very rigid mounting provided.



The Carden engine mounting. On the left may be seen the details, while the right-hand view shows the engine in an intermediate position. The cowling has been removed to show the mounting structure. (*Flight* photographs)

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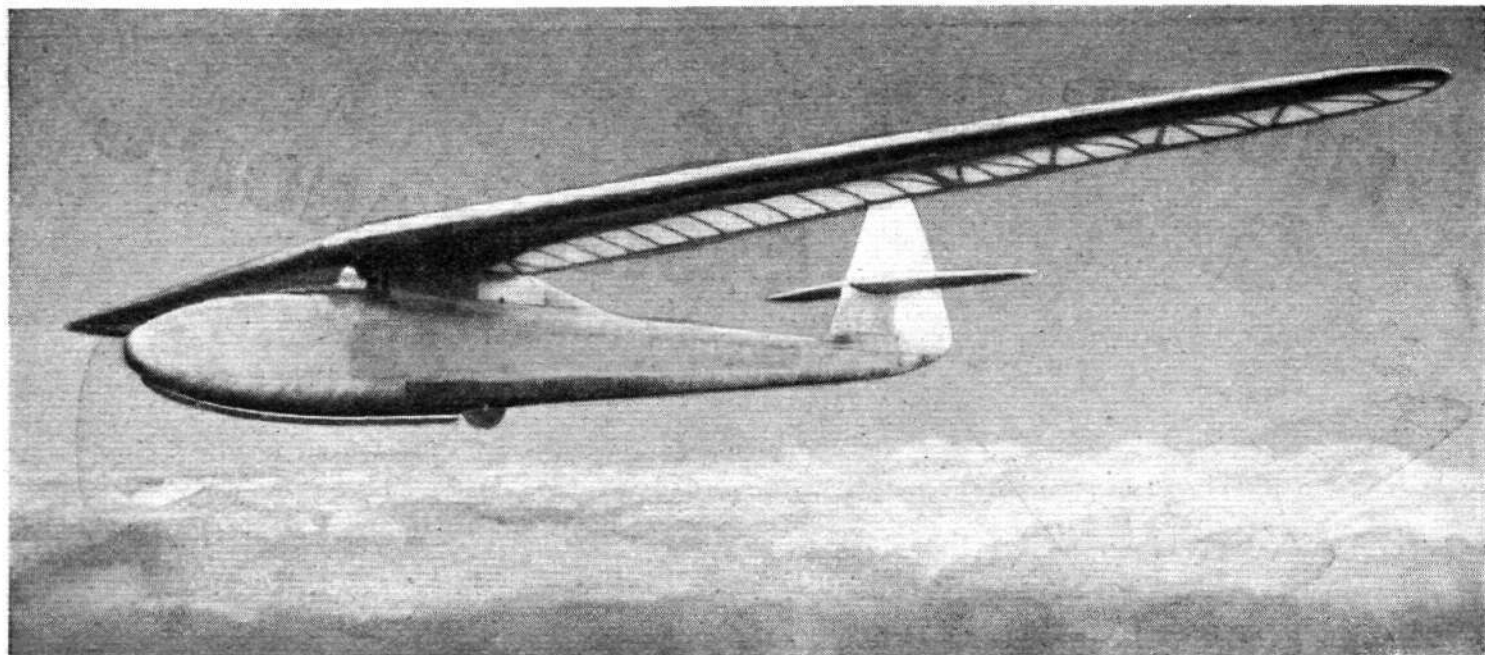
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CARDEN-BAYNES AUXILIARY SAILPLANES

Patented

DO you realise that on most days of the flying season sailplanes are capable of long distance flights across country?—In Germany flights of 100 miles are common and the record is over 200 miles. In this country we have many flights of between 50 and 100 miles; usually only terminated on reaching the sea. The only reason these flights are not accomplished almost daily is due to the difficulty in the initial start which can only be achieved with the correct combination of hill slope and wind.

This newest and most Wonderful Sport in the World is now possible, anywhere—The Carden-Baynes Auxiliary Sailplane can be launched single handed without starting crew, wind, or hill slope—Its small auxiliary motor enables you to climb many thousand feet for the expenditure of a few pennyworth of petrol only. You can then wind in the motor to a position where it is completely enclosed within the body of this perfectly streamlined sailplane and soar in silence for many hours and hundreds of miles with no expense whatever. It is so designed that it can be dismantled in a few minutes for storage or transport by trailer.

Provisional Price £250 . 0 . 0

This machine can also be supplied without the auxiliary engine unit, as a high efficiency sailplane. If, however, the auxiliary engine unit is subsequently required, it can easily be fitted.

*Patents applied for in Great Britain
and most foreign countries.*

ABBOTT-BAYNES SAILPLANES

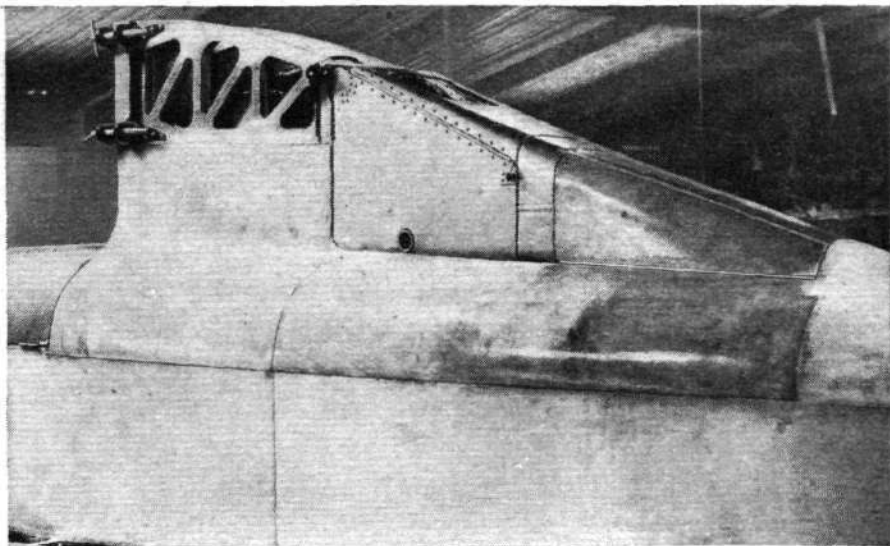
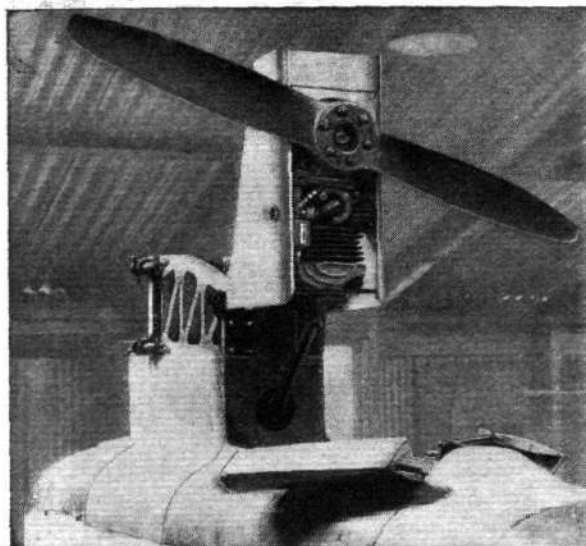
FARNHAM, SURREY

*Phones: 682-683.

Sir John Carden would be glad if Sailplane Constructors interested in making machines incorporating retracting units under his invention would apply to him direct to:—

**CARWARDEN HOUSE,
Camberley, Surrey**

Kindly mention "Flight" when corresponding with advertisers.



The Carden-Villiers auxiliary unit in the Carden-Baynes sailplane. When the unit is retracted (right), the lid over the opening in the deck is automatically closed, and the lines are as smooth and clean as those of any pure sailplane. (*Flight* photographs.)

The engine is raised into operating position or retracted into the fuselage very simply by a tube joined to the nut of a large threaded shaft or worm. This worm is rotated by a handle in the cockpit driving a chain and sprockets. Rotation in one direction makes the nut advance along the worm and lowers the engine, while rotation in the opposite direction causes the nut to travel backwards and raises the unit into the operating position.

A very ingenious "lid" has been produced for the fairing. When the engine is in the operating position this lid is held open by a spring, but as the engine is lowered the airscrew presses on a lever which overcomes the tension of the spring and, by a system of cranks and levers, causes the lid to close. When the engine is retracted the surface is very smooth and offers no extra drag.

It is necessary to stop the airscrew in a vertical position, since otherwise it will not go into the narrow space provided for it in the fuselage. This is done by a stop worked in conjunction with the lever of the starting gear. The latter consists of a ratchet wheel between two pulleys. When the starting lever in the cockpit is pulled back the cables pass over the pulleys until the chain engages with the ratchet wheel, which is, of course, on the forward end of the crankshaft. Continuing the pull causes the ratchet wheel and the crankshaft to rotate, and the engine starts. The stop provided for ensuring that the airscrew is vertical is operated by a lever on the starting handle, so arranged that the latter can only be pulled back to a predetermined position, in which the airscrew is vertical.

The cowling in front of the engine and the petrol tank above the engine are finished in a gold paint which harmonises extremely well with the varnished wood finish of the machine, and is a great improvement on the plain aluminium finish usually found.

Constructional Materials

The Carden-Baynes sailplane itself is a very interesting machine of the modern high-efficiency type, with very large span and heavily tapered wings. It is, of course, of all-wood construction, the wing having a plywood-covered nose and fabric-covered trailing portion, while the fuselage is planked with plywood and spruce.

A portion of the wing section which Mr. Baynes has used is of the highly cambered type, but at the root, where the wing joins the fuselage, the lower surface is flat. Two objects are achieved by this arrangement: first, the spars can be made a good deal deeper at the root, where extra strength is required (the wings being pure cantilever), and, also, a better shape of joint is secured, thereby probably reducing interference drag between root and fuselage. Towards the tip the wing section begins to change, and at the tips it becomes one of small chord and thickness and of reflex curvature.

The aerodynamic reasons for this progressive change of section and, incidentally, also angle of incidence, is to ensure that the centre portion of the wing shall stall first. A gentle dropping of the nose is further ensured by the fact that the

trailing edge is nearly straight and the leading edge swept back to it so that a certain measure of the stability of the tailless aeroplane is achieved. The ailerons, by the way, are differentially operated, so as to avoid adverse yawing moments.

For transport the wings can be quickly removed from the fuselage and stacked alongside it on a trailer. The two halves of the tailplane are also easily removable, and the whole machine can be dismantled in a few minutes.

The undercarriage has been reduced to the simplest possible form and consists of a single wheel mounted partly inside the floor of the fuselage. When the machine is at rest it tilts over with one wing tip on the ground, but the weight on the wing tip is very small, and as soon as the machine begins to gather speed the wing can be lifted by using the ailerons.

Cruising at 35 m.p.h.

A very good aerodynamic form has been chosen for the fuselage and considerable trouble has been taken to keep air drag as low as possible. For a height of some 10 to 12 inches the fuselage sides are flat, but the top and bottom are curved. Over the rear portion the covering is of plywood, but in the nose, where double curvatures occur, it would not be possible to use sheet material, and a built-up structure has been employed, consisting of two layers of narrow spruce strips laid on diagonally, the strips of the two thicknesses crossing each other at approximately right-angles. The whole of the woodwork is left in its varnished state without paint, a finish which looks very attractive and is somehow reminiscent of small boat building. The workmanship and finish are of a very high order, and the price will not be remarkably low. Until the Carden-Villiers auxiliary unit is ready (the present being merely an experimental unit produced to try out the principle) it is difficult to estimate production costs, but *Flight* understands that it is hoped to market the machine at £250.

The direct-drive airscrew looks almost ridiculously small, but the fact that the engine is of low power (it develops 9 h.p. at 3,500 r.p.m.) has made it possible to use a small diameter, and consequently the ratio $\frac{V}{nD}$ at low forward speeds is such that

quite reasonable airscrew efficiency can be obtained; the static thrust and thrust at low forward speeds are quite high, the pitch angle being so small that even at very low forward speeds the blades are not stalled.

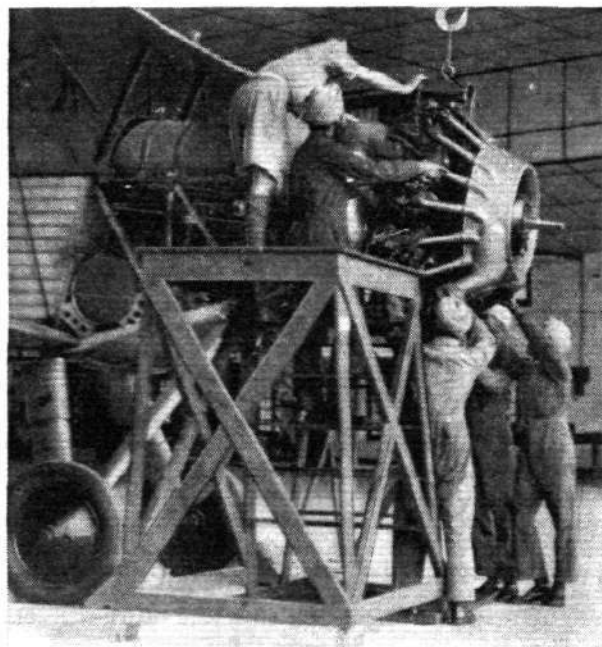
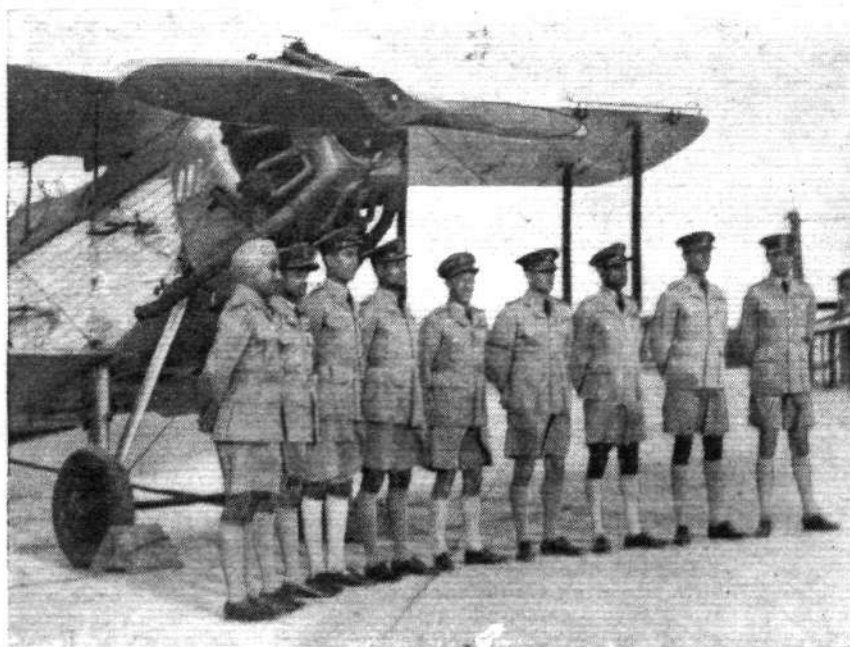
The machine has been designed for a cruising speed of approximately 35 m.p.h., and this will also be the speed at which the best rate of climb is attained. The very tiny petrol tank of the engine unit contains sufficient fuel for a flight of a little more than half an hour's duration, and it is thought that this will be sufficient for reaching with a margin to spare, a height where soaring is possible. Having reached this height the pilot will stop his engine, pull the starting handle slowly until the airscrew is vertical, and then wind-in his engine. He then has a pure sailplane with an L/D ratio of about 24. Should he get out of the up-current he will raise his engine into the operating position, start it, and proceed until he has found another up-current.

THE ROYAL AIR FORCE

SERVICE NOTES AND NEWS



AIR MINISTRY ANNOUNCEMENTS



The Indian Air Force: The officers of No. 1 Squadron, Karachi, and (right) work on an engine.

R.A.F. STAFF COLLEGE

The following Dominions officers passed the R.A.F. Staff College Qualifying Examination which was held in January, 1935:—

Royal Australian Air Force:

Flt. Lts. G. W. Boucher, R. H. Simms, W. S. Armstrong, P. M. Rickard, and H. G. Acton; F/O. D. A. J. Creal.

Royal Canadian Air Force:

Flt. Lts. D. H. MacCaul and W. D. Van Vliet; F/O. H. R. Carefoot.

"AB INITIO" FLYING TRAINING

The undermentioned officers have been awarded special assessments as shown hereunder on completion of a course of *ab initio* flying training at the R.A.F. College, Cranwell:—

Special Distinction

P/O. J. O. Hinks.

Distinguished Pass

P/O. R. A. E. Traill.

LONG SERVICE AND GOOD CONDUCT MEDAL

The Long Service and Good Conduct Medal has been awarded to the undermentioned airmen:—S.M.1 Eggleston, C. C., W.O. Harding, C. H. V., W.O.2's Endley, A. E. L., Jaggard, R. G. P., and Parry, E. G., Flt./Sgts. Barnes, J., Beer, A. A. J., Bevis, C., Clark, N. K. M., Forster, E., Fulton, H., Harvey, F. C., James, A. R., McInerny, J. S., Power, O., Richings, W. T., Robinson, W., Rutland, C. N., Scrivener, W. J., Steward, J. A. Ware, E. J., and Webber, W. A., Sgts. Collins, C. J., Eckersall, C., Evans, W. E., Filkins, H., Hart, F. S., Humberstone, F. W., Lloyd, H. L., Meggison, R., Stewart, N. J., Still, A., Terry, G. S., and Wiltshire, E., Cpls. Carter, A. E., Danger, J. F., Davies, A. G., Derbyshire, G., Goldthorpe, H. O., Houghton, W., Parsons, S. C., Pratley, H. H., Rouse, W. R. H., Taylor, T., Townshend, E. F., Venn, L. A. J., Walliker, E., Welch, H. C., White, W. C., and Wilson, F. A.

NEWPORT CAMP

Moorings have been laid down at Newport, Fife, for the flying-boat squadrons which this year, for the first time, are to carry out armament training on the range at Tentsmuir. The first squadron, No. 201 from Calshot, is expected there from about May 18 to June 15.

CADET COLLEGE SPORTS

The triangular athletic contest between the R.A.F. College and the R.M.A. and R.M.C. will be held at Sandhurst on May 11.

"SCAPA" FOR No. 202 (F.B.) SQUADRON

The first Supermarine "Scapa" for No. 202 (Flying Boat) Squadron left Mount Batten for Malta on April 29. For years past No. 202 (F.B.) Squadron has been "temporarily" equipped with Fairey 3F floatplanes, and with these useful craft many formation flights have been carried out in Mediterranean waters. At last the title of the squadron is to be justified by re-equipment with flying boats, and the pilots will doubtless be delighted to receive such an excellent type as the "Scapa" with its two Rolls Royce "Kestrel" engines. One "Scapa" has already made a long experimental cruise in the Mediterranean, including two non-stop flights between Malta and Gibraltar. With normal load, the range of the machine is over 1,000 miles.

RE-EQUIPMENT OF UNITS

The following re-equipment of Royal Air Force Units has recently taken place:—

No. 30 Squadron	...	Hardy replaced Wapiti
No. 36 Squadron	...	Vildebeest replaced Horsley T.B.
No. 205 Squadron	...	Singapore replaced Southampton
No. 604 Squadron	...	3 Hart replaced Wapiti
No. 820 Squadron	...	Shark replaced Seal
No. 447 Flight	...	Osprey replaced IIF F.A.A.

The following Units are expected to complete or commence re-equipment during the next few months:—

*No. 7 Squadron	...	Heyford replacing Virginia
*No. 8 Squadron	...	Vincent replacing IIF. G.P.
*No. 19 Squadron	...	Gauntlet replacing Bulldog IIA
No. 24 Squadron	...	Hart replacing Osprey
No. 29 Squadron	...	Demon replacing Bulldog IIA
No. 101 Squadron	...	Overstrand replacing Sidstrand
No. 202 Squadron	...	Scapa replacing Southampton
No. 208 Squadron	...	Audax replacing Atlas A.C.
No. 604 Squadron	...	Demon replacing Hart and Wapiti
No. 4 Flying Training School	...	Audax replacing Atlas A.C.
No. 1 Coast Defence Training Flight	...	Osprey replacing IIF. F.A.A.
No. 204 Squadron	...	Scapa replacing Southampton

*Re-equipment of these Units has already commenced.

THE BEST IN THE GAME

LYMPNE

BROOKLANDS

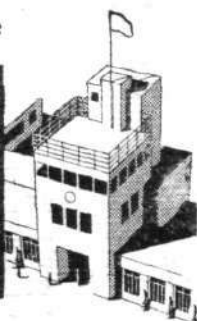
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will give you the **BEST** flying tuition, the **BEST** repair and overhaul service, the **BEST** flying club amenities, the **BEST** facilities for private ownership, including fully equipped Sales Department, any make of new or used aircraft supplied.

The amenities of three modern flying clubs, first-rate instruction and coaching by front-rank men, a highly efficient servicing, maintenance and repair organisation—you get it all as a member of Brooklands, Lympne and Northampton. And, what is more, it is economical, not only in actual flying and instruction rates, but also because membership of one club entitles you to membership at the other two as well. Write for booklet "A" to-day to one of the addresses given below.

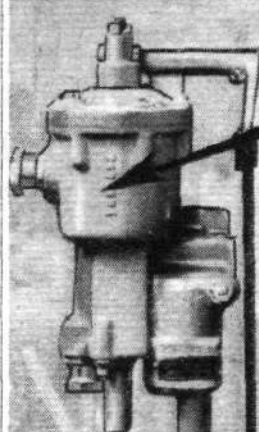
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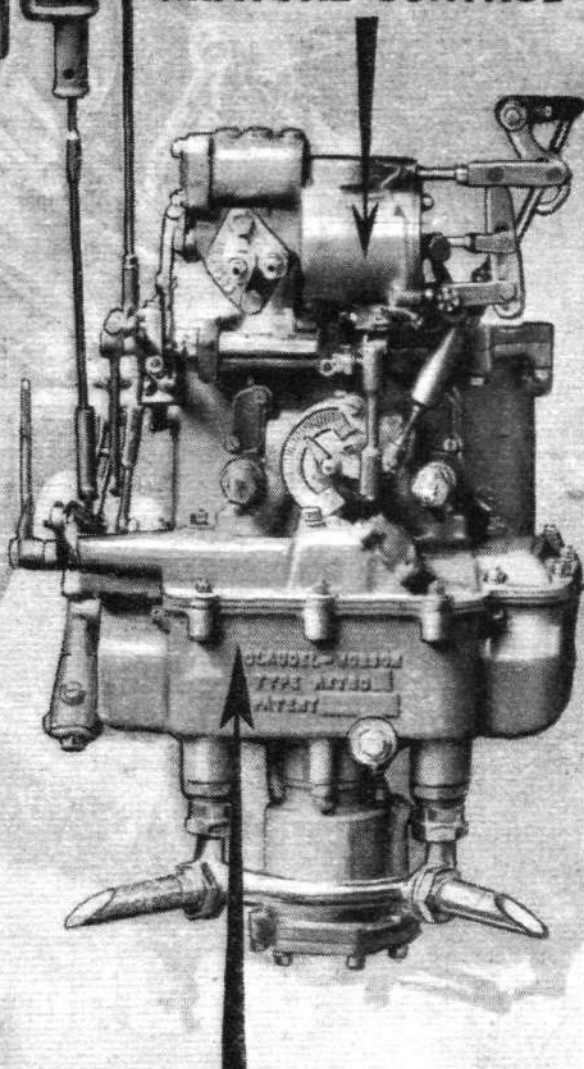


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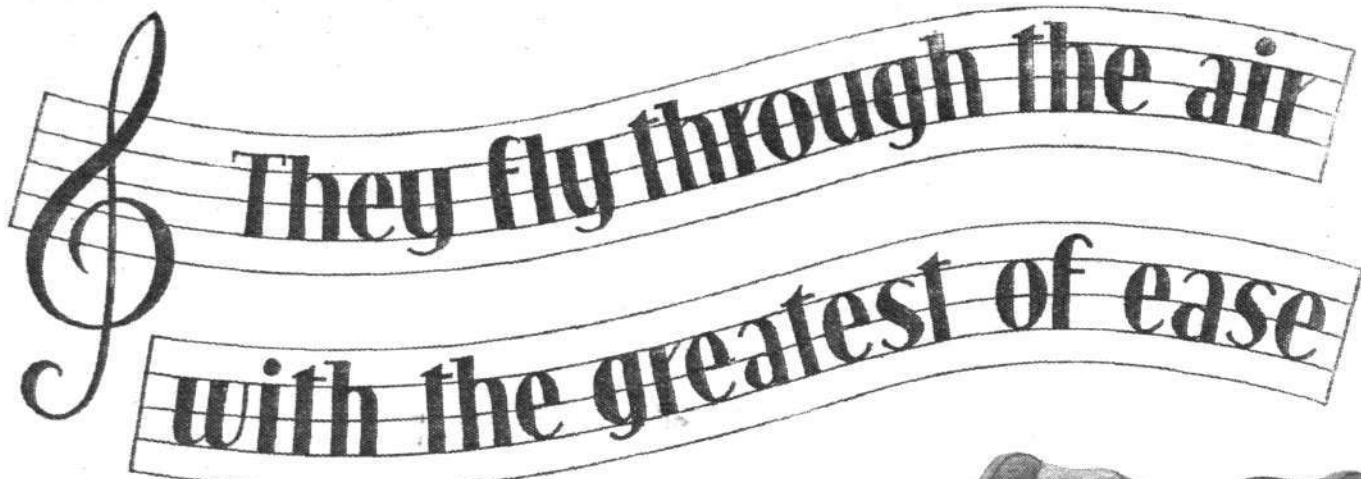
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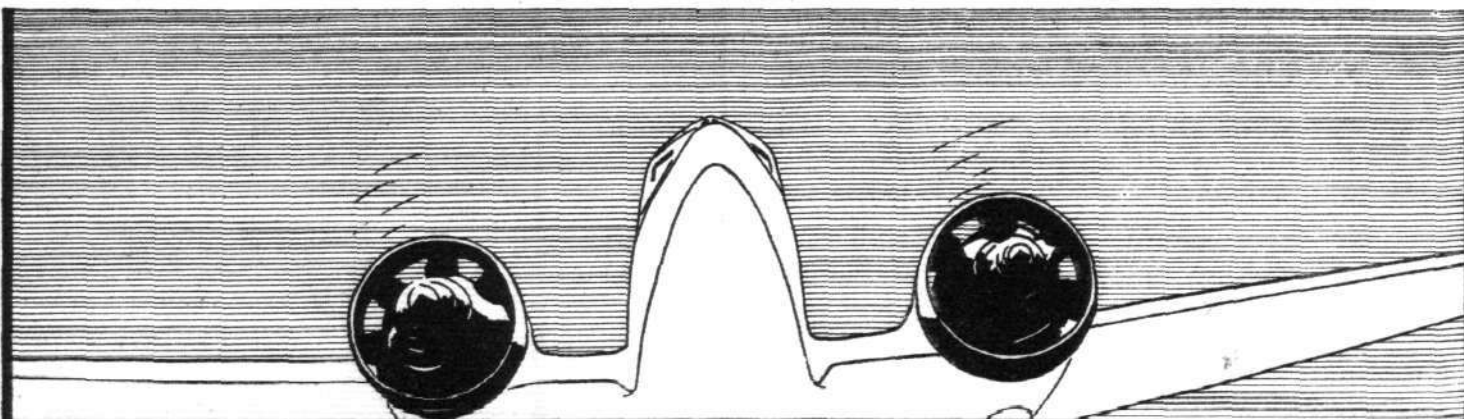
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FAR EAST FLIGHT DINNER

The annual dinner of the officers of the Far East Flight will be extended to include those officers of the Royal Air Force who have served in Singapore or Hong Kong. The dinner will be held on Friday, May 17, in London, and, if numbers permit, at the Royal Air Force Club. Officers who intend to be present should forward their names to Sqdn. Ldr. D. V. Carnegie, A.F.C., Headquarters, Air Defence of Great Britain, Royal Air Force, Uxbridge, as early as possible in order that the necessary arrangements may be put in hand.

KILLED BY AIRSCREW

F/O. M. C. Moore, of No. 216 (Bomber Transport) Squadron, R.A.F., which is on a flight from Cairo to the Cape, was accidentally killed on April 29 at Tororo, Uganda. His machine, when landing, overran the aerodrome and came to a stop in long grass. F/O. Moore, after getting out, walked into one of the revolving aircrews, and was so severely injured that he died soon afterwards.

ROYAL AIR FORCE GAZETTE

London Gazette, April 30, 1935

General Duties Branch

The following are granted short service commissions as Acting Pilot Officers on probation with effect from and with seniority of April 16:—R. C. Ayling, M. R. Baillon, M. Beckett, J. L. M. Bell, H. R. A. Beresford, P. H. Bragg, L. O. Brooks, W. H. Carroll, R. Cave-Browne-Cave, G. A. L. Cheate, M. G. W. Clifford, J. J. E. Coats, G. L. A. Cooper, R. B. Cox, A. G. F. Cunningham, C. F. Darbishire, P. J. G. Davies, G. W. P. Derbyshire, G. H. J. Feeny, D. V. W. Francis, G. H. N. Gibson, D. E. Gillam, J. Greenhalgh, J. C. Halley, D. A. Hamilton, P. M. Hamilton-Hall, R. B. Harvey, A. C. Heath, P. G. Heath, J. V. Hoggarth, G. R. Humphries, C. J. K. Hutchins, E. P. W. Hutton, E. L. Hyde, H. H. A. Ironside, A. G. T. James, H. B. Johnson, C. H. Jones, H. D. Jones, J. A. C. Karran, P. G. Keeble, R. N. Keeble, F. J. Kelly, G. A. H. Kent, L. J. Kiggell, R. H. S. King, L. A. G. S. Lewer, T. M. Lockyer, R. C. Love, F. R. McAllister, K. M. McCrudden, A. S. McTurk, F. A. Marlow, C. A. Masterman, C. G. Masters, R. A. Milward, W. E. Mulford, P. C. R. O'Hara, R. J. Ommanney, C. L. Page, R. H. Paterson, M. V. Peters-Smith, P. C. Pinkham, A. C. Rabagliati, J. Rankin, P. H. Richmond, E. G. Rogers, B. D. Sellick, J. B. W. Smith, J. G. Spencer, P. A. M. Stickney, R. D. Stubbs, G. W. C. Watson, J. L. Wells, E. L. Wurtele, A. J. Young.

A.P/O. on probation I. S. Williams is confirmed in rank and graded as Pilot Officer (March 16).

The following Flying Officers are promoted to the rank of Flight Lieutenant:—D. W. Bayne (Feb. 15); N. C. Hyde (March 13); J. N. Baxter (April 11).

P/O. L. V. Spencer is promoted to the rank of Flying Officer (April 15); F/O. J. G. Ross is transferred to the Reserve Class C (May 1); Flt. Lt. S. A. Turner, M.B.E., is placed on the retired list (April 28).

Chaplains Branch

The Rev. C. A. B. Allen, M.A., is placed on the retired list at his own request (May 1).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Wing Commander.—W. A. Coryton, M.V.O., D.F.C., to Headquarters, R.A.F., Iraq, Hinaidi; for special duty at Mosul, 18.4.35.

Squadron Leader.—J. Noakes, A.F.C., M.M., to Armament Training Camp, Leuchars; for flying duties at Tentage Camp, Newport, 23.4.35. G. O. Venn, to No. 13 (Army Co-operation) Squadron, Old Sarum; to command vice Sqdn. Ldr. P. Warburton, M.B.E., 24.4.35. J. H. Winch, to No. 3 Flying Training School, Grantham; for Engineer duties vice Sqdn. Ldr. H. J. Roach, 24.4.35.

Flight Lieutenants.—W. R. Baird, to No. 203 (Flying Boat) Squadron, Basrah, Iraq, 18.4.35. J. D. S. Denholm, to Armament Training Camp, Leuchars, 1.4.35. L. R. S. Freestone, to Armament Training Camp, Leuchars, 1.4.35. E. J. George, to No. 6 Flying Training School, Netheravon, 18.4.35. J. W. Gillan, to Central Flying School, Wittering, 17.4.35. A. Leach, M.C., to H.M.S. *Courageous*, 23.4.35. J. R. D. Goadsby, to R.A.F. Station, Gosport, 3.4.35. N. H. Fresson, to No. 65 (Fighter) Squadron, Hornchurch, 24.4.35.

AIR RAID PRECAUTIONS

Wing Cdr. E. J. Hodsoll has been appointed an Assistant Under-Secretary of State in the Home Office in charge of the new Air Raid Precautions Department. Wing Cdr. Hodsoll was formerly assistant secretary to the Committee of Imperial Defence.

OFFER FROM LADY HOUSTON

Lady Houston has sent the following message to the Secretary of State for Air:—

"To commemorate the Jubilee of the King, and in view of the dire necessity of the present moment, Lady Houston begs to renew her offer of £200,000 for the air defence of London, the capital of the King's Empire, which she believes is now utterly unprotected."

FOREIGN OFFICERS WITH THE R.A.F.

Lt. Li-shou Chen, of the Chinese Air Service, has been attached to No. 10 (B) Squadron, Boscombe Down, from April 29 to May 4, 1935, and to No. 23 (F) Squadron, Biggin Hill, from May 7 to May 11, 1935, following completion of a thirteen weeks' course at the School of Army Co-operation, Old Sarum.

AIR FORCE LIST

The May issue of the *Air Force List* has now been published. It can be purchased (price 2s. 6d.) from H.M. Stationery Office at the following addresses: Adastral House, Kingsway, London, W.C.2; 120, George Street, Edinburgh; 2, York Street, Manchester; 1, St. Andrew's Crescent, Cardiff; 15, Donegall Square, Belfast; or through any bookseller.

ROYAL AIR FORCE RESERVE*Reserve of Air Force Officers
General Duties Branch*

K. E. Kennedy is appointed to a commission as a Pilot Officer in class A (May 1); P/O. H. C. Beard is promoted to the rank of Flying Officer (March 21); F/O. R. W. Jackson is transferred from class A to class B (April 20).

The following are transferred from class A to class C:—Flt. Lt. J. H. Barringer (March 19); F/O. A. M. Mackay (August 24, 1934); F/O. R. H. C. Taylor is transferred from class C to class A (Feb. 25).

The following relinquish their commissions on appointment to short service commissions in the R.A.F. (April 16):—F/O. R. Cave-Browne-Cave, P/O. G. W. P. Derbyshire.

F/O. A. M. Cowell is removed from the service (April 17); the notification in the *Gazette* of March 5 concerning F/O. L. H. Mason is cancelled.

SPECIAL RESERVE*General Duties Branch*

P/O. on probation J. H. Smith is confirmed in rank (March 11); P/O. on probation A. J. Young relinquishes his commission on appointment to a short service commission in the R.A.F. (April 16).

AUXILIARY AIR FORCE*General Duties Branch*

No. 602 (CITY OF GLASGOW) (BOMBER) SQUADRON.—P/O. K. E. Kennedy relinquishes his commission on appointment to a commission in the Reserve of Air Force Officers (May 1).

No. 604 (COUNTY OF MIDDLESEX) (FIGHTER) SQUADRON.—Sqdn. Ldr. A. S. Whitehorn Dore, D.S.O. (Lt.-Col.) (Hon. Wing Commander), relinquishes his commission and command of the squadron on completion of service (April 8).

AUXILIARY AIR FORCE RESERVE OF OFFICERS*General Duties Branch*

Lt. Col. A. S. W. Dore, D.S.O., is granted a commission as Sqdn. Ldr. (Hon. Wing Commander) in class C (April 8).

W. M. C. Kennedy, to Central Flying School, Wittering, 24.4.35. T. N. McEvoy, to No. 1 (Fighter) Squadron, Tangmere, 24.4.35.

Flying Officers.—A. N. Luxmoore, to No. 25 (Fighter) Squadron, Hawkinge, 23.4.35. H. L. M. Glover, to No. 24 (Communications) Squadron, Hendon, 23.4.35. G. T. Jarman, to R.A.F. Depot, Aboukir, Egypt, 26.3.35.

Pilot Officers.—N. D. Ashton, to No. 43 (Fighter) Squadron, Tangmere, 23.4.35. P. S. Hutchinson, to No. 43 (Fighter) Squadron, Tangmere, 23.4.35.

Acting Pilot Officer.—W. E. Legard, to No. 1 Armoured Car Company, Hinaidi, Iraq, 18.4.35.

Stores Branch

Squadron Leader.—J. K. McDonald, to No. 22 Group Headquarters, South Farnborough; for Equipment (Stores) Staff duties, 17.4.35.

Medical Branch

Flight Lieutenants.—R. E. Alderson, to Central Medical Establishment, London, 23.4.35; R. E. W. Fisher, to Aircraft Depot, Karachi, India, 21.3.35.

PRIVATE FLYING

LORD SEMPILL, AFTER VISITING THE GOLD MINES AT KALGOORLIE, FLIES UP THE WESTERN COAST OF AUSTRALIA AND MAKES A FORCED LANDING ON THE BEACH

KALGOORLIE, seen from the air, appears to cover a large area, and presents rather a curious effect due to the method of piling up the ore from the gold mines. This gives the town an appearance from above which somewhat resembles that of Babylon. The aerodrome at Kalgoorlie is large, although the surface is not particularly good, but it is equipped for night flying. The hangar is one belonging to the Air Survey Group that has been employed on work for the Western Mining Corporation. This organisation, under Wing Commander Laws, has recently completed an air survey of some 10,000 square miles, the results of which are now being studied and worked upon by the geological staff of the company.

When I saw Mr. Lindsay Clark, the chairman of the Western Mining Corporation, he told me that air survey in the gold-mining regions was becoming of increasing importance. He had no doubt of its value to the geological staff, as it enables their work to be greatly speeded up and rendered more easy by having access to detailed air survey maps. These maps vary from 1,200 feet to the inch to 100 feet to the inch, and in certain special cases even lower. The work that has been done by Wing Commander Laws is particularly good.

The survey involved the taking of approximately thirty thousand photographs, the finished results of which are excellent. Before air operations could start it was necessary to organise ground transport. This necessitated the building up of a fleet of cars to carry all the personnel and equipment, including that necessary for the making of certain ground surveys. A most important item in this hot climate is the refrigerated dark-room equipment.

Kalgoorlie—Perth

I HAD a most interesting time at Kalgoorlie, and visited several mines, although when I was there work had been suspended for five weeks owing to a labour dispute.

The route between Kalgoorlie and Perth, which was my next stage, is about 350 miles, and used to be lighted by beacons spaced sixty to eighty miles apart. I should have liked to have tested out this equipment by making a night flight, but was astonished to learn from a telegram from Major Brearley that all the lights on this section had been removed to other routes. Considering the importance of this main air route from the west to the east of the Continent, this action certainly seemed a very retrograde step. I arrived at Perth after about four hours' flying, and had a long conversation with Wing Commander Laws and Dr. Moss, the principal geologist of the Western Mining Corporation.

In the evening I dined with Major Brearley, who has done so much pioneering aviation work in Western Australia. I was interested to get his views on the future air development of the Commonwealth, and also of the type of aircraft which are required there. He thought that for the private owner it would be necessary to produce a small two-seater selling at not more than £500. For the air-transport operator a twin-engined four- to six-seater cruising at not less than 140 m.p.h., and which could be produced in bulk to sell at from £1,200 to £1,500, would find a market. In addition, a twin-engined ten-seater cruising at about 175 m.p.h. was required.

Major Brearley has a number of D.H.50 machines which are ten or more years old, and were used to open up the

In Western Australia

West Australian air routes. Although these machines are in first-rate flying condition, they are no longer in service. In addition, he has a number of "Hercules" machines still perfectly serviceable, but not giving a sufficiently good performance for modern requirements. On the Perth-Adelaide Service he is running "Dragons," but is carefully thinking out plans as to how this old flying equipment may be utilised. It is one of the difficulties of organised air transport that—as in other parts of the world—aircraft which are properly maintained tend to outlast their period of usefulness. I spent several very interesting days in Perth, where I was entertained by the Aero Club, which is doing good work.

On leaving Perth, the Western Australian Aero Club insisted on escorting me part of the way, and I took off accompanied by three club "Moths." We made a tour of Perth and the surroundings, and I then left for the north *en route* for Wyndham.

Ants Aboard

HAVING promised to call on some friends, I made a stop at New Norcia, some hundred miles north of Perth, where they had marked out a suitable field for landing and had lit a small fire to indicate the direction of the wind. It was very hot, so we pushed the machine under a gum tree to shelter it from the sun, and went off to lunch. A little later I was called back to the machine, which, I found, had been invaded by ants, many thousands of which had got aboard. On investigation I discovered that the spot we had chosen to picket the aeroplane was over an ants' nest, so that we soon found a fresh site.

At each stop on the flight along the west coast I was received with much hospitality, and was often pressed to stay longer than I had contemplated. My casual call at New Norcia lengthened to a day's visit, and the whole community turned out to see me leave the next morning. I made Geraldton by noon, and lunched there with Bishop O'Collins, leaving later for Carnarvon, which I reached before dusk. Here I found that two receptions had been organised for me—one by the Town Council and one by the Returned Sailors' and Soldiers' Association. After flying all day, such functions keep one pretty fully occupied, and there is not time to do as much to the machine as one would wish. However, I left Carnarvon before daylight the next day with the idea of making Broome, where I wanted to gain some information regarding the pearling industry.

Kangaroos

ON the way to Onslow I saw a greater number of kangaroos than in any other part of Australia. Whilst engaged on a closer inspection of these animals, I was passed by a "Dragon," belonging to the McRobertson-Miller air line which was carrying the English mail to be turned over to Qantas Empire Airways at Daly Waters. To Onslow the weather had been good, but on leaving that town rain began to fall, and this became heavier as I proceeded. The wind, which was facing me, increased to 40-50 m.p.h., and the clouds were so low that I was forced to fly along the coast at less than 100 feet.

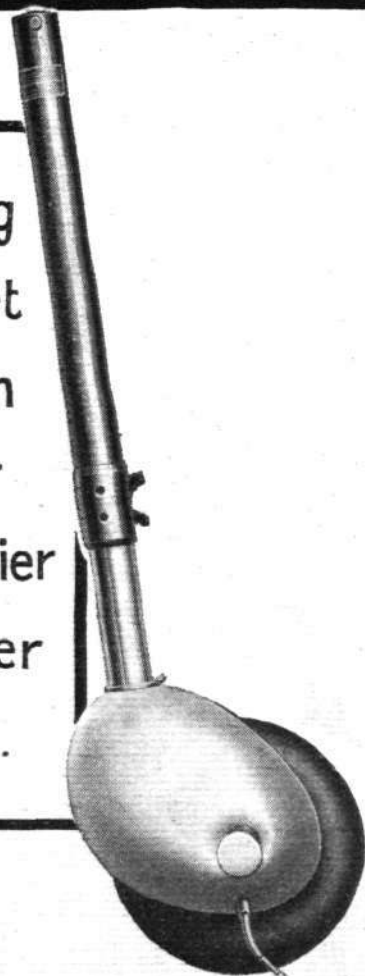
Conditions became worse, and, as I knew that the aerodromes ahead would probably become unusable with the heavy rain that was falling, I thought it better to land. The only place at all possible was the seashore, and, choosing a likely spot, I came down comfortably, but in the last twenty yards of the landing run the sand was very soft, and the machine sank up to the axles. This was but a prelude to one of the worst experiences I had on the whole flight.

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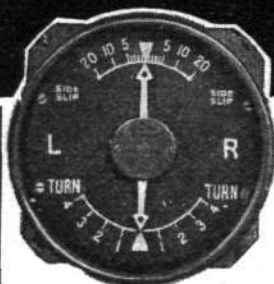


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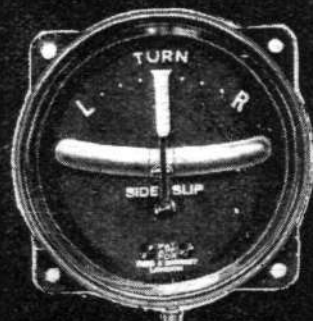
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FROM THE CLUBS

Events and Activity at the Clubs and Schools

TOLLERTON

Cross-country trips were made last week to Brough, Sherburn-in-Elmet, Leicester, Portsmouth and Whitchurch. There were ten visiting aircraft and 40 hr. 30 min. was flown on club machines, bringing the total flying time for April up to 120 hr. 48 min.

CASTLE BROMWICH

Mr. Edward Marsh has purchased a Miles "Hawk." Amongst the new members are Messrs. C. G. Mitchell and A. H. Swann (flying) and Miss M. Ford and Messrs. J. J. Collins and F. Bentley (ordinary). Visitors include the Earl of Cardigan, Messrs. Lacayo, Bonnikson, Winn and Crawford. Flying times were 27 hr. 55 min. dual and 10 hr. 50 min. solo.

REDHILL

The Hon. T. T. Parker has gone "solo" on the Auto-giro, being the second club member to do so, and Mr. Hooson made his "B" licence night flight from Lympne. Six pupils are taking wireless courses, and the following new members have joined the club:—Messrs. E. W. Cairns, P. P. Allender, G. R. Fountain, J. M. J. Fryer, H. Campbell Russell and W. G. Stuart-Menteth and Mrs. W. Stroud.

KILLARNEY

A branch of the Cork Aero Club has been formed in Killarney, and the first flying meeting was held on April 28. Mr. Dease, the instructor, in his Klemm "Swallow," took ten members for first instructional flights, and Miss Hallinan's "Moth" was kept busy giving joy-rides to prospective flying members.

Regular flying meetings will be held throughout the summer from May 16. A temporary flying field has been loaned to the club by the Earl of Kenmare, but a permanent aerodrome is being prepared by Sir Maurice O'Connell, who runs the Country Club Hotel, situated on one of the most beautiful sites in the district.

CINQUE PORTS

The Army has always been a strong supporter of aviation at Lympne, and three officers from the Small Arms School at Hythe have recently joined the club to take "A" licences. They are the Lord Kildare, Mr. H. D. Bingham, and Mr. P. J. Johnstone.

Last Monday could be aptly termed as "Ladies' Day"—Miss Andrews and Miss Yardley both successfully gained their "A" licence certificates, and while these tests were in progress Miss Jean Batten, on her way from Australia to London, circled the airport in admiration.

Two members of the ground staff, Messrs. Wedderburn and Jackson, went solo for the first time, the former after only five and a half hours' dual instruction.

Statistics show that during the first quarter of this year 347.30 hours were flown, as against 302.05 hours flown during the same period in 1934. This is particularly encouraging considering that weather conditions this year were very much worse than last year. Flying hours this week totalled 67.40.

Mr. Ken Waller has gone to take up the temporary duties of chief instructor at Brooklands.

LIVERPOOL

The flying return for April shows an increase of 43 hr. over the corresponding period last year. During the fortnight ended May 5 156 hr. 15 min. flying was recorded.

On Saturday, May 18, a cross-country flying competition will be held from Hooton, commencing at 2.30 p.m. The winner will receive a silver cup. A special "Jubilee" dinner and dance is to take place at the Speke clubhouse at 7.30 p.m. on Friday, May 10.

HAMPSHIRE

Five Hampshire machines and eleven members took part in the Dawn Patrol to Reading on Sunday, April 28.

The club's five machines during April flew 174 hr., of which 11 hr. 40 min. represents "blind" flying. Lieut. P. H. Higginbotham, R.N., Mrs. N. E. Higginbotham, Miss J. P. Richardson, Cadet Leader A. H. White, R.N.R., and Mr. G. Burry have made their "first solos," and Capt. H. A. Crommelin, Flt. Lt. N. A. West, F/O. W. S. Jenkins and Miss E. Knight Bruce have become members.

NORTHAMPTONSHIRE

On Saturday, May 4, over 8,000 people watched the air display organised by the Northants Aero Club and Mr. R. O. Shuttleworth in connection with the Jubilee celebrations at Bedford. Weather conditions were ideal, and five machines were kept busy from 10 a.m. until dusk joy riding. Several private owners called in.

The club is indebted to Lord Willoughby de Broke, Mr. S. A. Thorn, Flt. Lt. Tommy Rose, Flt. Lt. Peter Faire, Mr. Musker, Mr. Jackson, Mr. Geoffrey Linnell, Mr. Charles Hayne and Mr. E. C. Goldsmith, the club's instructor, for the parts they played in the flying programme. The Royal Air Force support helped to make the show a great success, and Messrs. Clapham and Dwyer "did their stuff." Mr. Clapham had a very good shaking up in a "Cadet" flown by Mr. E. C. Goldsmith, and managed to lose his trousers.

The fine weather is greatly increasing the flying activities at Sywell, and the tennis courts are in great demand.

HATFIELD

The flying time for last week at the London Aeroplane Club was 80 hr. 45 min. Messrs. P. J. S. Boyle and D. W. Sutton made first solo flights, Mr. F. J. Bush completed the tests for his A licence, and three new members, Miss J. E. Harvey and Messrs. W. W. MacLellan and F. Ten Bos, joined.

On Saturday afternoon Mr. A. S. Butler, the chairman of the De Havilland Aircraft Co., opened the new clubhouse which he has presented to the company.

During the week, incidentally, three Australia-England record holders visited the club. Photographic evidence can be seen at the foot of this page. Miss Jean Batten, incidentally, learnt to fly at the London Club.

The Committee of the R.A.F. Flying Club has acquired a "Puss Moth," and this is causing some interest, especially amongst service pilots, who do not often have the opportunity of flying cabin machines. Another machine for club use is expected shortly.

ALL TOGETHER: Three Australian record holders, Mr. H. L. Brook, Mr. James Melrose and Miss Jean Batten, take tea at Hatfield with Mr. Adkins of the De Havilland Company.



Private Flying

NORTH STAFFORDSHIRE

During April the North Staffordshire Aero Club flew 104 hours from Meir aerodrome. There were two "A" licences and four "first solos" by Messrs. Powell, Walker, Peters and Miss Beresford. Mr. and Mrs. Badger took one of the club's machines for a flying honeymoon at Easter. The next hot pot supper will be held on May 25.

ABERDEEN

Flt.-Lt. D. G. Allison, R.A.F.O., has been appointed chief instructor at the Aberdeen Flying School.

During the week before April 22 the total flying time was 10 hr. 15 min., of which 5 hr. 10 min. was dual. On three days no flying was done owing to the bad weather. On the following week the figure dropped to a slight extent, owing again to the poor weather experienced.

SOUTHEND

The amenities of the new clubhouse, opened during the Easter week-end, have been greatly appreciated by the members of the Southend Flying Club, and an increasing membership has been the immediate result.

In spite of high winds and inclement weather flying continued in full swing throughout the week ended April 3, and more than twenty hours of instructional flying was recorded.

BRISTOL AND WESSEX

Since the Bristol and Wessex Aeroplane Club Flying Scholarships were announced last week over 100 entries have been received. It was originally decided to award two scholarships, but if the number of entries justifies it is possible that additional scholarships will be given.

The entry forms for the Society of British Aircraft Constructors' Challenge Trophy Race, which is being organised at Bristol, on June 15, are now ready.

LEICESTER

Leicester Municipal Aerodrome now being licensed, the club has removed its machines and all flying equipment to these premises. The clubhouse, of course, has been occupied since November last.

During April 79 hours were flown by the Leicestershire Aero Club, and thirty-seven trips were made to eleven different aerodromes by club members. Night flying instruction was given on two nights.

AUTOGIRO SCHOOL

Flying time on school machines last week amounted to 34 hr. 15 min. Charter and other trips occupied 4 hr. 45 min. New pupils for the complete "A" licence course are Messrs. M. F. Oliver and G. W. Roberts, and Lt. Corellou of the French Navy, Mr. A. Batchelor (a new private owner of a C.30), and Mr. Spratt, who holds a pilot's "B" licence, are also under instruction.

"First solos" were made by the Hon. T. M. Horder and Mr. W. Gibson. Major A. Q. Cooper has completed his "A" licence tests.

LEEMING

During April 103 hours were flown by the Yorkshire Aviation Services' school. Mr. V. H. Hodgson has successfully concluded his "B" licence tests and has now joined the staff, while Mr. N. Hodgson has become a director. Mr. Rickards and Mr. Jaggar passed their "A" licence tests.

The company recently took delivery of a "Puss Moth" from the Cinque Ports club. It is intended to use this machine for taxi work. A Shell pump has been installed.

The school machines now number four: a Miles "Hawk," a "Puss Moth," and two "Gipsy Moths."

BROOKLANDS

Flying hours last week totalled just over 100, as is usual in the early spring.

New members were S. C. McQuown, A. B. Rappoport, and R. H. N. Saunders, and J. A. M. Henderson, L. P. Driscoll (the famous racing motorist), S. J. Graveley, W. F. F. Attlee, and Dr. N. Whitehurst made "first solos." Messrs. P. Gold and J. Jeffers have taken "A" licences.

On Tuesday Capt. and Mrs. Duncan Davis, Capt. and Mrs. Findlay and Mr. Massey flew to Blackpool to attend the wedding of Capt. Ian Mackenzie and Miss Marr. Incidentally, Capt. Mackenzie, who is chief instructor at Brooklands, has been appointed general manager of the R.A.F. Reserve School at Northampton, and will take over his duties on June 1.

Mr. Sholto Douglas is away for ten days on a blind flying course, and Mr. Ken Waller has been temporarily transferred from Lympne to Brooklands. A landing competition was held on Sunday afternoon, and was won by Mr. Henderson.

CAMBRIDGE

Flying time for week ended May 4 amounted to 66 hours. Messrs. R. Sleigh and F. W. Green have passed their "A" licence tests, and Messrs. A. M. Leader, T. G. H. Kirkwood, Slazenger, and F. A. Pearson, and Capt. A. C. Taylor, and Mrs. Pirie have become members. Mr. S. C. Wayman made his "first solo."

Flying for the first three months of the year shows an increase of 100 per cent. on the corresponding period of 1934.

The telephone number has been changed to Teversham 331.

WITNEY AND OXFORD

Mr. Bernard Walker, lately a pupil of Universal Aircraft Services, has been appointed club ground engineer, and will shortly undergo necessary tests for his "B" licence. A club member, Mr. P. E. Lawrie, has purchased a German Klemm with a Salmson engine.

Capt. the Rt. Hon. F. E. Guest visited the club recently. During last week the club's flying time totalled 22 hr. 30 min., of which 12 hr. 5 min. was solo flying. Sir James Heron Walker, Bt., a new member, went solo after four hours' dual.

BENGAL

Although only one machine has been in commission no less than 92 hr. 15 min. flying was logged during March.

Mr. L. K. Mahanti is taking dual instruction, Mr. P. Bose has gone solo, and Mr. S. N. Acharjya and Mr. A. L. Jones have passed their "A" licence tests. Mrs. I. J. Lewis has bought Mr. Chowdhury's Klemm "Swallow" and is flying it regularly. On January 6 Mr. B. K. Das with Mr. Biren Roy flew to Beernagore to open the new landing ground there.

The total membership of the club is now 275, of which number 126 members are Europeans.

HERTS AND ESSEX

Roger Frogley and Capt. Graham visited Berck last week in the "Hawk." Mr. J. H. Harrington completed his Croydon-Cardiff-Hamble-Croydon "cross-country" for his "B" licence tests, and Mr. B. D. Whitaker, the chief ground engineer, his Category "B" licence. Incidentally, the ground staff is working in two shifts, day and night, to deal with increasing work; this will continue throughout the summer. The fancy dress dance held last week proved most enjoyable.

Flying time totalled 69 hr. 5 min. Mr. D. C. Griffin passed his "A" licence tests, and Mr. T. Rees completed the night flight for his "B."

The "Margaret Blackshaw" Cup was won by Mr. W. S. Dack, with Messrs. V. A. Ercolani and Y. Pouguet second and third. Mr. and Mrs. Radford won the "Broxbourne Fitch," and Mr. and Mrs. "Buster" Frogley gained second place.

A Christening at Heston

Last Sunday Lt. Col. F. C. Shelmerdine presided at the formal christening of the latest addition to the fleet of Air Hire, Ltd.—a Miles "Falcon" 3-4-seater cabin monoplane. The machine was named *Ariel*.

Last week, incidentally, the squash courts at Heston, provided by Mr. T. R. Bryans, were opened.

Irish Aviation Day

It is hoped that the International Air Rally at Dublin on May 11 will help to put Ireland on the air map in a most practical manner. Between 2 and 2.30 p.m. private pilots from Europe, Great Britain and Ireland will converge on Phoenix Park. A valuable trophy, kindly presented by the Irish Hospitals' Trust, as well as money prizes, will be presented to the competitors whose machines cross the finishing line nearest to the secret sealed time. Sir Alan Cobham is collaborating with his air display. Interested private owners should write to the Irish Aero Club, 10, Pearse Street, Dublin, giving the necessary details.

Free Flying in Yorkshire

The York County Aviation Club, of Sherburn-in-Elmet aerodrome, has made arrangements to train one selected pupil from each of several districts throughout the county. Selection of the pupils, who must be between the ages of 18 and 30, will be made at various aerodromes in the county after a trial lesson for which the pupil pays the nominal sum of 10s. 6d. The best of the actual selected pupils will also be given an advanced course. Further details can be obtained from the Club, which has, incidentally, made great strides since the beginning of the year.

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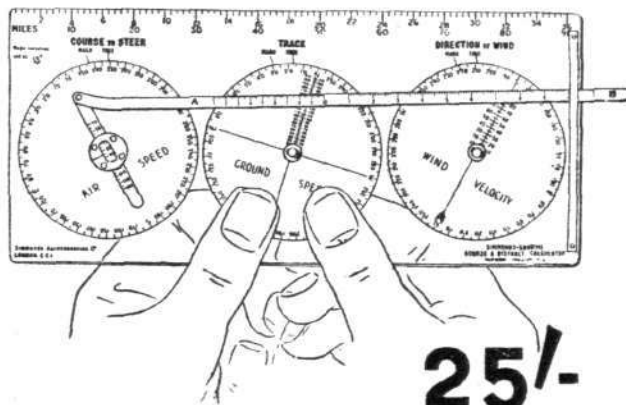
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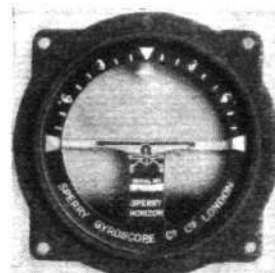
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(Somerton Aerodrome)									
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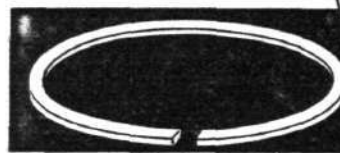
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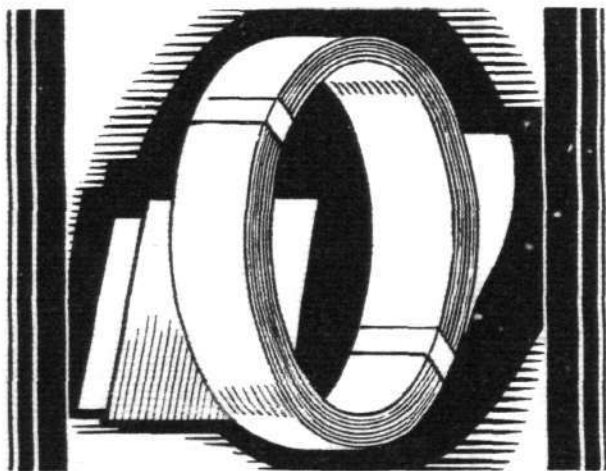
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FOR SERVICE IN SOUTH AMERICA : The first of six new high-speed amphibians which are to be used along the Amazon River from Para to Manaus and in other sections of the Pan American Airways system. A description appears on page 503.

UNITED AT BLACKPOOL

Inauguration of New Direct Service Between London and Blackpool : Connections with the Isle of Man, Carlisle and Glasgow

AS Sir Philip Sassoon remarked at the luncheon at Blackpool on April 30, given in honour of the opening of United Airways' new services, Blackpool, famous for the flying meeting as long ago as 1909, was the first municipality to plan its own airport. Small wonder, therefore, that the opening of a direct high-speed service between the County Borough and the Metropolis should be treated as an event of paramount importance.

Three machines—two D.H. 86s loaned by Jersey Airways and flown by Eckersley-Maslin and Blythe, and United's first D.H. 89 flown by Lynch-Blosse—carried a number of notabilities, including Lt. Col. F. C. Sheldermine, and a host of Press representatives on the opening service from Heston, which was covered in a little over an hour and a half. Sir Philip Sassoon himself travelled from Hendon in the new Communications "Rapide," with an escort of four Auxiliary "Harts"—and a very impressive sight they were as the five machines flew in tight formation over Blackpool. In addition to the Mayors of Heston and Blackpool, who flew from London, the Mayors of Carlisle, Douglas and Ramsey flew from their respective towns in two Spartan "Cruisers." It was originally intended to use one, but the Carlisle-Ramsey machine, which was to have picked up the Island contingent, met thick weather and was ordered, by radio, straight to Stanley Park. Actually, though the weather was very thick at times during the overland journeys, it was only near the coast that the clouds showed signs of wishing to "sit on the deck."

In the course of the many speeches during the luncheon at the Clifton Hotel, Councillor R. W. Marshall, Chairman of the Airport Committee, who proposed the toast of the Air Ministry, suggested that the Ministry might possibly take some share in the expenses of airport layout and maintenance. Sir Philip Sassoon, replying, said that he hoped that the pioneer stage of inland air transport would soon be over. The Mayor of Stoke-on-Trent counselled a stop at Meir aerodrome and Lt. Col. Sheldermine was glad to see that overland, as opposed to overseas, lines were being developed. Air traffic, he said, was, for the most part, new traffic and was not taken from the older means of transport.

Capt. H. H. Balfour, a director of United Airways, inviting suggestions for the possible improvement of the services, said that of comfort, speed and safety, the greatest factor in air line operation was safety and that his company intended to see that this always came first. Several new extensions, he said, were under consideration, but the moment of public demand and of the opening of a line could not always coincide. The Mayors of Carlisle, Heston, Douglas and Ramsey replied to the toast of the guests, proposed by Councillor J. E. Horsman.

For the present the London-Blackpool service will be flown twice each way daily, the Blackpool-Isle of Man service will be flown four times each way daily, and the Island-Carlisle service will be flown once each way except on Saturday and Sunday, when three and two services respectively will be flown. The Isle of Man to Glasgow service will be opened on May 17 with a single return service on Friday, Saturday, Sunday and Monday. This, of course, is run by Northern and Scottish Airways.

The United fleet consists of two "Rapides"—another will shortly be added—and two Spartan "Cruisers." All the machines have radio equipment.

In Northern India

Indian National Airways, who operate regular services between Calcutta and Rangoon, Calcutta and Dacca, and Karachi and Lahore, report a steady expansion of charter work in Northern India. The company holds four aircraft available for this purpose—an Avro Ten and a "Puss Moth" based at Delhi, and two Percival "Gulls" at Lahore. Month by month the demand for private flights has steadily increased and a large number of distinguished passengers, including the Viceroy, have been carried. Mr F. Tymms, the Director of Civil Aviation, and Major Brackley, of Imperial Airways, also flew to Udaipur and Nasirabad in connection with possible Imperial route modifications, as already noted in *Flight*. During the season a number of night flights over Delhi were carried out.

THE WEEK AT CROYDON

New Services : The Jubilee Celebrations : Flying Over the Beacons : K.L.M.'s Northern Service Opens

EARLY in the week the Prince of Wales' new D.H. 89, painted in the attractive Guards colour scheme, arrived at Croydon, though H.R.H. was not himself travelling in it.

On May 1 several new services were inaugurated. K.L.M. put on an extra service to and from Holland, so England and the Netherlands are linked with six daily services each way, if that of D.L.H. is included. The London-Milan service via Frankfurt, was also opened by K.L.M., D.L.H. and A.L.I., the Italian company. Passengers leave Croydon at 9.0 a.m. and reach Milan at 5.45 p.m.

The Scandinavian Air Express brought a consignment of Swedish ice cream to London one day last week. Judging from the number of gentlemen on tricycles who infest our highways with portable refrigerators, one would suppose it unnecessary to import this commodity.

Capt. Parmentier, of K.L.M., brought one of the company's Douglas aeroplanes across for the Royal Aeronautical Society's garden party last Sunday. Amongst those who travelled to Heathrow in the machine were Sir Macpherson Robertson and Lady Robertson, Lord Sempill and Mr. and Mrs. Plesman.

The airport hotel was gaily decorated for the Jubilee, but I saw only one decorated aeroplane—our very old friend the Surrey Flying Services' Avro, which suddenly went gay with a coat of striped red, white and blue paint. There was a sportsman in a red, white and blue jockey cap in attendance

with a be-ribboned megaphone. All regular services were full before the Jubilee, and many duplicated services were run. On Sunday and Monday traffic was naturally somewhat slack, but a rush period started after the festivities.

Inner Circle Air Lines have been full, and duplication has been necessary. It is rumoured that this company has acquired several new machines and that an Outer Circle is the next step on the programme. This company, as well as many others, has done a good deal of night flying. The illuminations, bonfires, beacons and fireworks were, I am informed, a truly magnificent spectacle from the air. One passenger I spoke to was most impressed by the fact that the lights actually twinkled when seen from a considerable height. Olley Air Service, Ltd., made a couple of Press flights over the neighbourhood of London for different newspapers, and on Monday night Capt. Olley took Lord and Lady Londonderry, Lord and Lady Hailsham and Mr. Ramsay MacDonald for an air cruise over the beacons of the Home Counties. This company also had a couple of rush jobs after the Kempton Park races to collect owners, trainers and jockeys—but, so far as I know, no horses—to Chester in time for the racing there.

The K.L.M. Croydon Manager, who is also Superintendent of the company's North of England lines, flew up to Liverpool by Railway Air Services, Ltd., for the opening of the Liverpool-Hull-Holland line on May 1. Afterwards he flew from Hull to Amsterdam and thence to Croydon, this being the most convenient way home!

A. VIATOR.

The Australian Section

Last week Mr. McMaster, of Qantas Empire Airways, and Mr. Rudder, of Imperial Airways, left Darwin by air for London, where the future of the Singapore-Brisbane section will be discussed.

Speeding the South Atlantic Mails

A director of Deutsche Luft Hansa recently announced in Rio de Janeiro that within a short time the mail schedule between Brazil and Berlin will be reduced from five to three days. New aeroplanes, capable of making regular non-stop flights over the Atlantic, will be used, thereby eliminating the need for the refuelling ships at present in use with the flying boat service.

In Italy

During last year Italian air lines flew 2,735,938 miles in 24,893 hours, and carried 40,930 passengers, 124,519 lb. of mail, 238,474 lb. of papers, 1,339,715 lb. of baggage, and 409,036 lb. of general freight.

Cork Airport Scheme

That a resolution of the Cork Aero Club, putting forward claims for the establishment of a civil aerodrome at Cork, is being forwarded to local authorities is of particular interest since Cork is looked upon as an important base. The matter was discussed last week by the Cork Harbour Board, on whose land the proposed airport is to be built, and the Board unanimously approved the resolution.

This is Charter Work!

On Jubilee Day and Night Birkett Air Service, Ltd., flew no less than 4,500 miles, 500 of which were flown at night. Needless to say, this fabulous mileage was not entirely covered with the Birkett standard fleet; various machines and pilots were "roped in" for the occasion. Actually, eight machines and eight pilots were out during the period.

The work consisted mainly of the distribution of plates and films, but reporters were also carried, and Capt. Birkett himself took one journalist for a long flight at night over the beacons of the Home Counties.

Forthcoming Events

Club Secretaries and others are invited to send particulars of important fixtures for inclusion in this list.

May 12. Aviation Day, Phoenix Park, Dublin.
May 19. Deutsch de la Meurthe Cup, Aero Club de France.
May 23. Jubilee Air Ball, Air League of the British Empire, at the Dorchester Hotel, London.
May 25. Empire Air Day, Air League of the British Empire.
May 29. Household Brigade Flying Club. Night-Flying Demonstration, Heston.
May 30. Wilbur Wright Lecture, by Mr. Donald W. Douglas, Science Museum, South Kensington.
June 1. Brooklands "At Home."
June 1-15. Lisbon Aero Show.
June 7-11. Whitsun Flight through Austria, Oesterreichischer Aero Club.
June 8. London Aeroplane Club. Garden Party, Hatfield.
June 8. Official opening and garden party, Witney and Oxford Aero Club.
June 15. R.A.F. Flying Club Annual Display, Hatfield.
June 15. Bristol and Wessex Aeroplane Club, S.B.A.C. Challenge Cup, Whitchurch.
June 16. Scottish Flying Club Display, Renfrew.
June 29. Royal Air Force Display, Hendon.

July 1. S.B.A.C. Display, Hendon.
July 6. Royal Air Force Fly-past before H.M. the King at Duxford.
July 7. Douze Heures D'Angers, Aero Club de France.
July 13. Opening of Leicester Municipal Airport.
July 20. Opening of Brighton, Hove and Worthing Municipal Airport, Shoreham.
July 20-21. Coupe Armand Esders, Aero Club de France.
July 28. Private Owners' Garden Party, Ratcliffe, Leicester.
Aug. 17. Round the Isle of Wight Air Race and Portsmouth Air Trophy.
Aug. 24-25. Third International Flying Meeting, Lympe.
Aug. 24-25. Cinque Ports Club. International Flying Meeting and Wakefield Cup Race.
Aug. 24-30. Raduno del Littorio, Rome. Reale Aero Club d'Italia.
Sept. 4-18. Jungfrauoch Concours, Aero Club de Suisse.
Sept. 6-7. King's Cup Air Race.
Sept. 14. Cinque Ports Club. Folkestone Aero Trophy Race.
Sept. 15. Gordon Bennett Balloon Race, Warsaw.
Oct. 12-28. International Aircraft Exhibition, Milan.

K.L.M.'s Eastern Speed-up

When, on June 12, the Royal Dutch Air Lines duplicate their service to Batavia, twelve Douglas machines will be put into service. The whole trip should be covered in five and a half days, Rangoon in four, and Karachi in three days.

An Aerodrome for Indore

Adequate provision has been made in the current year's budget of Indore State (Central India) for the construction of an aerodrome, with facilities for night landing. A site has been found about two miles from the capital city. Emergency landing grounds will also be laid out.

New Director for Hillmans

Mr. Gerard D'Erlanger, who is a well-known amateur pilot and son of Baron D'Erlanger, the banker, has joined the board of Hillman's Airways, Ltd. Incidentally, the company is expecting to take delivery of its first D.H. 86 later this month and of two more in June.

K.N.I.L.M. Changes

Since May 1 the Royal Netherlands Indies Airways (K.N.I.L.M.) has flown the Batavia-Bandoeng service three times a day in each direction, and on the same day a reduction in rates was made. Last Monday another 630 miles was added to the K.N.I.L.M. network with a weekly trial service from Soerabaja to Macassar (Celebes) via Den Pasar.

Crilly Airways' Plans

Bookings between Leicester and Bristol have been heavy recently, and Crilly Airways have been using a "Fox Moth" for the Norwich section. During May the company will be opening new services between Doncaster and Nottingham and between Leicester and Northampton. In June, services between Leicester and Skegness and Nottingham and Skegness—previously run by Mr. M. D. L. Scott—will probably be opened.

Unsubsidised Flying in Japan

According to *The Aerial Age*, Tokyo, regular Japanese air liners carried 12,783 passengers over 1,201,115 miles during 1934. 603,511 lb. of mails and freight were carried, and six forced landings were made.

Japanese air lines now run between Tokyo, Osaka and Dairen; Osaka, Takamatsu and Matsuyama; Tokyo and Nūgata; and Tokyo and Shimizu.

Since July, 1922, Japan Air Transport has operated a service between Osaka and Matsuyama. On January 1 this company opened a new line between Osaka and Shirabama, and this is the first unsubsidised service in Japan. During the first month of operation the regularity was 90 per cent., and 429 passengers were carried on this and on joy-riding services. One of the two machines used is a D.H. "Fox Moth."

The London Chamber of Commerce

At a special meeting of the Civil Aviation Section of the London Chamber of Commerce, held on April 29, Viscount Ratendone was elected Chairman for the current year in place of Mr. Ivor McClure, who recently resigned on his appointment as Operational Adviser to the Director-General of Civil Aviation.

Night Flying in India

Several firms have been asked to offer tenders for the supply of the entire equipment for night landing, including beacons, over the trans-Indian air routes. The installation of the beacons and their power supply presents some difficulty where no railway, municipality, or private company has a power station. In at least three or four places on the air mail route it will be necessary to install a small generating plant.

Another Transcontinental Record

With the aid of half a gale blowing from the West a T.W.A. Douglas flew last week from Los Angeles to New York, a distance of 2,400 miles, non-stop in 11 hr. 5 min., beating the previous transport record by about half an hour. The gyro-pilot was in charge of the machine during the major part of the flight, which was made partly to test new radio beam developments. Most of the flying was done at an altitude of more than 12,000 ft.

"Electra" Developments

A Lockheed "Electra" is now produced with P. and W. "Wasp" 450 h.p. engines in order to supply the needs of operators who have surplus engines of this type in stock. So far all the 10.c. series, as this type is designated, have been delivered to Pan American Airways and to their subsidiary companies. Pacific Alaska Airways have just taken delivery of their second. The "Wasp Electra," incidentally, cruises at 190 m.p.h. at 12,000 ft., with ten passengers.

An Arctic Airline

An Arctic airline, 1,900 miles long, from Cape Schmidt, through Wankarem to Wellen on Providence Bay, along the coast of the Behring Sea, to Anadyr and then through Kamenskaya and Gizhiga to Nagayeva, is to be established by the central administration of the Northern Sea Route. In addition, an air service will be maintained between Cape Schmidt and Wrangel Island, carrying mail and freight twice a month. For the first time Wrangel Island will maintain connections with the mainland throughout the year. Lines are planned to Kolyma and possibly to Indigirka to connect with those extending from Tixie Bay to Indigirka on the Western side.

A regular air service, which will connect Capt Schmidt and Anadyr, making a short cut over the Anadyr mountain range, is also planned.



BLACKPOOL'S GREAT DAY: Sir Philip Sassoon, with his four escort pilots and the Mayor of Blackpool (Ald. G. Whittaker, J.P.), photographed with other notabilities when Sir Philip visited Blackpool for the inauguration of United Airways' service, described on page 515.

THE INDUSTRY

A "SAFEGUARD" CONTROL

THE Dixon-Bate Safeguard Control has been produced to provide means whereby an aircraft (or, for that matter, a car) can be protected against fire resulting from damage to electrical equipment in a crash or due to the continued operation of the engine after such an accident. A further object is protection against theft. The device has been approved by the Air Ministry for use in civil aircraft.

Essentially the control, which is contained in a metal box, consists of a weight so arranged with relation to its point of connection with a link that up-and-down movements of the machine in which it is fitted do not tend to affect its position. Should the aircraft strike an obstruction "head on," however, the sudden check to its momentum will cause the weight to carry the pivotal connection of two links (to the upper one of which it is attached) to the left of a line joining their pivoted ends. The lower link is connected with a spring-loaded lever which, when its position is altered by the movement of the weight, causes two points to make contact with the electrical leads, and, in the case of the particular control illustrated, earths the ignition system to the metal container. The device in this form is also applicable to each engine of a multi-engined aircraft.

By means of the action described a variety of objects can be attained. For example, the electrical system may be rendered dead, the fuel supply cut off, the magneto earthed, the coil disconnected, and the dynamo rendered inoperative. By adjusting the position of the weight along the link to which it is attached, the sensitivity of the device can be controlled so as to ensure that no degree of braking will bring the mechanism into operation, but leaving it free to operate only on the impact of the machine with an obstruction.

The manufacturer is B. Dixon-Bate, Bridge Works, Chester.

SPLIT SECONDS

In the usual run of things stop-watches are fairly expensive items—in so far as highly accurate work is concerned, at any rate—but there are many occasions in aviation when the possession of a stop-watch is really desirable. A. Arnold and Co., who are specialists in this kind of instrument, have recently placed on the market a very useful watch, fitted with a large second-hand and stop mechanism, giving readings in $\frac{1}{2}$ sec., selling at only 10s. 6d. (or 15s. in the wrist model). It is a 30-hour watch, also suitable for general use as a time-piece. This firm also supplies various other models in stop-watches, ranging in price from 25s. to £5 10s., the latter model, calibrated in $\frac{1}{2}$ sec., having speeds (m.p.h.) over quarter-mile distances marked around the dial.

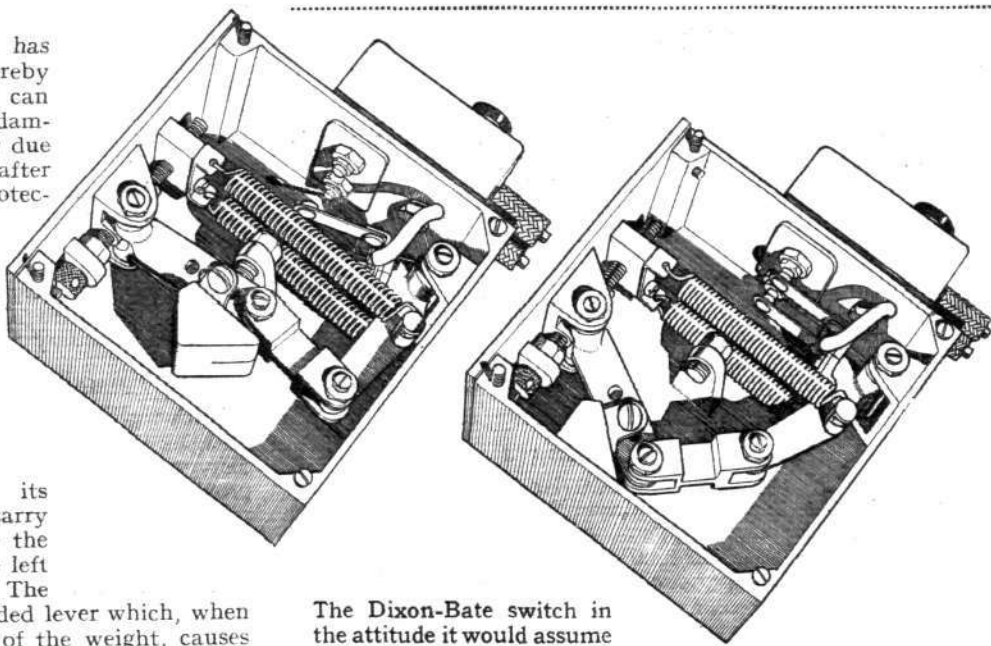
Incidentally, the firm has just moved into larger premises at 19, Clerkenwell Road, London, E.C.1; their telephone number—Clerkenwell 6240—remains unchanged.

TOWARD FUEL TANK SAFETY

With the object of increasing the safety of fuel tanks in the event of crashes or aerial combat, Air Venturers, Ltd., of 4, Woodvale, Cowes, I.O.W., have been developing tanks made of fabric, and others protected against incendiary bullets. Capt. F. L. M. Boothby, R.N., is the designer.

For the fabric tank the makers claim that it can be tucked away in places where a metal tank could not be inserted, that the seam is as strong as the rest of the material (about one ton per yard run), and that it is not weakened by distortion in a crash. A fabric tank of the company's manufacture has completed its tests at Farnborough, and has been approved for trial in civil aircraft. A tank of this type stood a crash test of 40 ft., and was also tried from 50 ft., behind five bars of pig iron representing an engine. Only one seam, round the lid of the tank, opened for about a foot. Two other tanks of similar pattern scored highest marks in the crash test during the Air Ministry Safety Fuel Tanks Tests, being the only ones fit to repeat this test in spite of the fact that they were the lightest examples entered.

It is desirable that the tanks of service aircraft be protected against incendiary bullets. So long as oxygen is excluded from contact with the fuel, no fire can occur. The Boothby



The Dixon-Bate switch in the attitude it would assume in an aircraft descending at an angle of about 45 deg.

In the second view, impact has taken place and the weight has sprung downwards, closing the contacts.

fireproof fuel tank comprises an inner and an outer tank, both of which are filled before the machine leaves the ground. All the fuel in the outer tank is used first, and is automatically replaced by an inert gas, so that the outer tank becomes a protecting gas chamber. It is probable that by the time the aircraft became involved in an action the balance of the fuel would be fully protected in this manner.

Tanks of this type have had every type of British and German incendiary bullets fired into them, and no fire has resulted. The weight is about 0.6 lb. per gallon capacity for normal-sized tanks made of metal.

MISS BATTEN'S FLIGHT

K.L.G. sparking plugs were used in the "Gipsy I" engine of Miss Jean Batten's "Moth."

PUBLICATIONS RECEIVED.

- Annual Report of the World Power Conference, 1934.* Central Office of the World Power Conference, 36, Kingsway, London, W.C.2.
- Planes Directory of the Aviation and Allied Industries.* Price 12s. 6d., Planes Publishers Ltd., London.
- Menace—A Novel of the Near Future,* by Leslie Pollard. Price 7s. 6d., T. Werner Laurie, Ltd., London.
- England—Australia Race Covers,* by Major Alan Goodfellow. Obtainable gratis from A. Phillips, Air Mail Specialist, 4, Dock Street, Newport, Mon.
- Victoria Glencairn.* By Glenda Spooner. Price 7s. 6d. net, William Heinemann Ltd., London.
- Crack Up!* By D. Bartlett (3s. 6d., John Hamilton, Ltd., London).
- The Air V.C.s,* by Capt. W. E. Johns (3s. 6d., John Hamilton, Ltd., London).
- Photographic Records of the Great War (Air Services),* published at 6d. by the Imperial War Museum, London.
- Elements of Practical Flying,* by P. W. F. Mills (4s. 6d., Technical Press, Ltd., London).
- Aeronautical Research Committee Reports and Memoranda.* No. 1547. Experimental Investigation of Boundary Layer Flow. By L. F. G. Simmons and A. F. C. Brown. Price 1s. 3d. net; No. 1612: Consumption Measurements in Flight with Variable Ignition. By J. L. Hutchinson and E. Finn. Price 9d. net. H.M. Stationery Office, London, W.C.2.
- New Catalogue of Wellworthy piston rings and pistons. Wellworthy, Ltd., Lymington, Hants.
- New Catalogue of Hoffman needle roller bearings. The Hoffman Mfg. Co., Ltd., Chelmsford, Essex.
- Electrical and Wireless Equipment of Aircraft,* by S. G. Wybrow. (Aeronautical Engineering Series for Ground Engineers.) Price 5s. net. Sir Isaac Pitman and Sons, Ltd., London.
- Aeronautical Research Committee Reports and Memoranda:* No. 1626. Interference Effect of Surface of Sea on a Flying Boat, by W. L. Cowley and G. A. Millan. May, 1934. Price 1s. net; No. 1627. Tests of Six Aerofoil Sections at Various Reynolds Numbers in the Compressed Air Tunnel, by E. F. Relf, R. Jones and A. H. Bell. September, 1934. Price 1s. 6d. net. H.M. Stationery Office, London, W.C.2.
- Aeronautical Research Committee Reports and Memoranda:* No. 1621. Cine-Photographic Measurements of Speed and Attitude of "Southampton" Aircraft when Taking-off and Alighting, by A. E. Woodward Nutt and G. J. Richards. September, 1934. Price 1s. net; No. 1623. Effect of Discs on the Air Forces on a Rotating Cylinder, by A. Thom. January, 1934. Price 9d. net. H.M. Stationery Office, London, W.C.2.
- L'Aéronautique en Pologne,* by Bogdan J. Kwiecinski. Edition de L'Aeroklub Rzeczypospolitej, Poland.
- Lubricity—House-organ of Fletcher Miller, Ltd.,* makers of "Coolidge" cutting lubricants.

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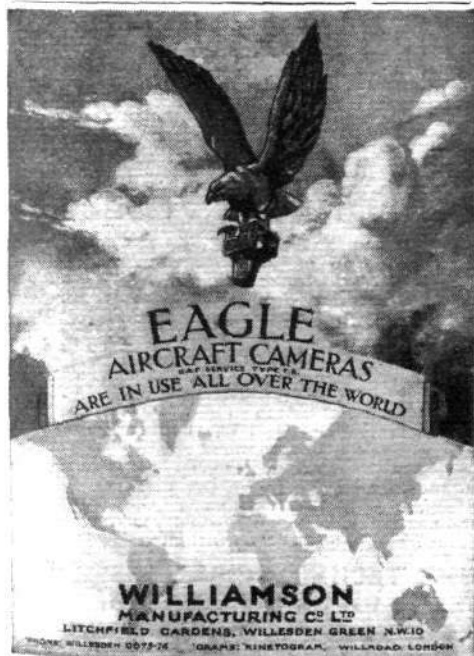
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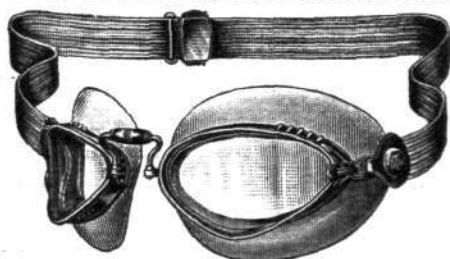
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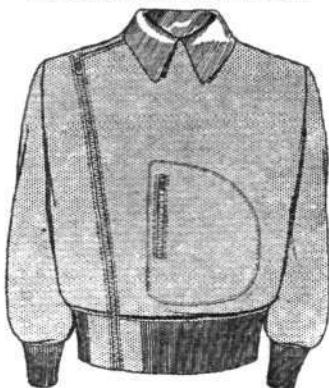
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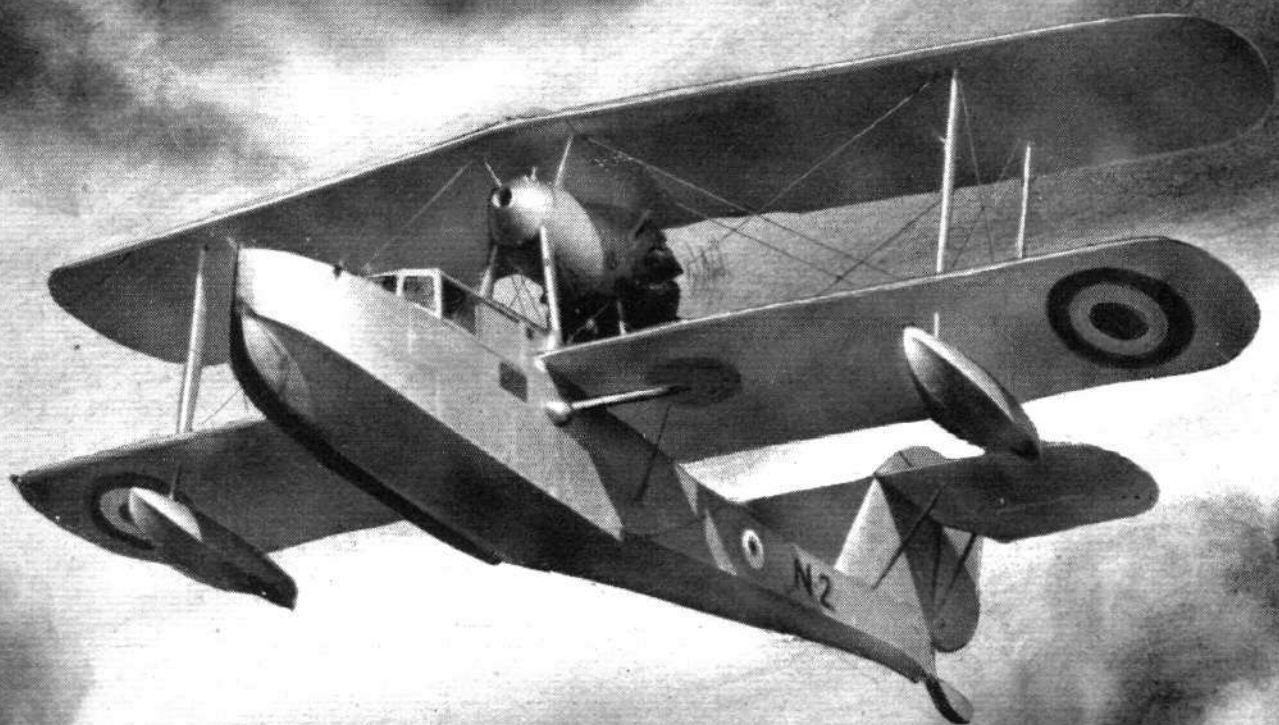
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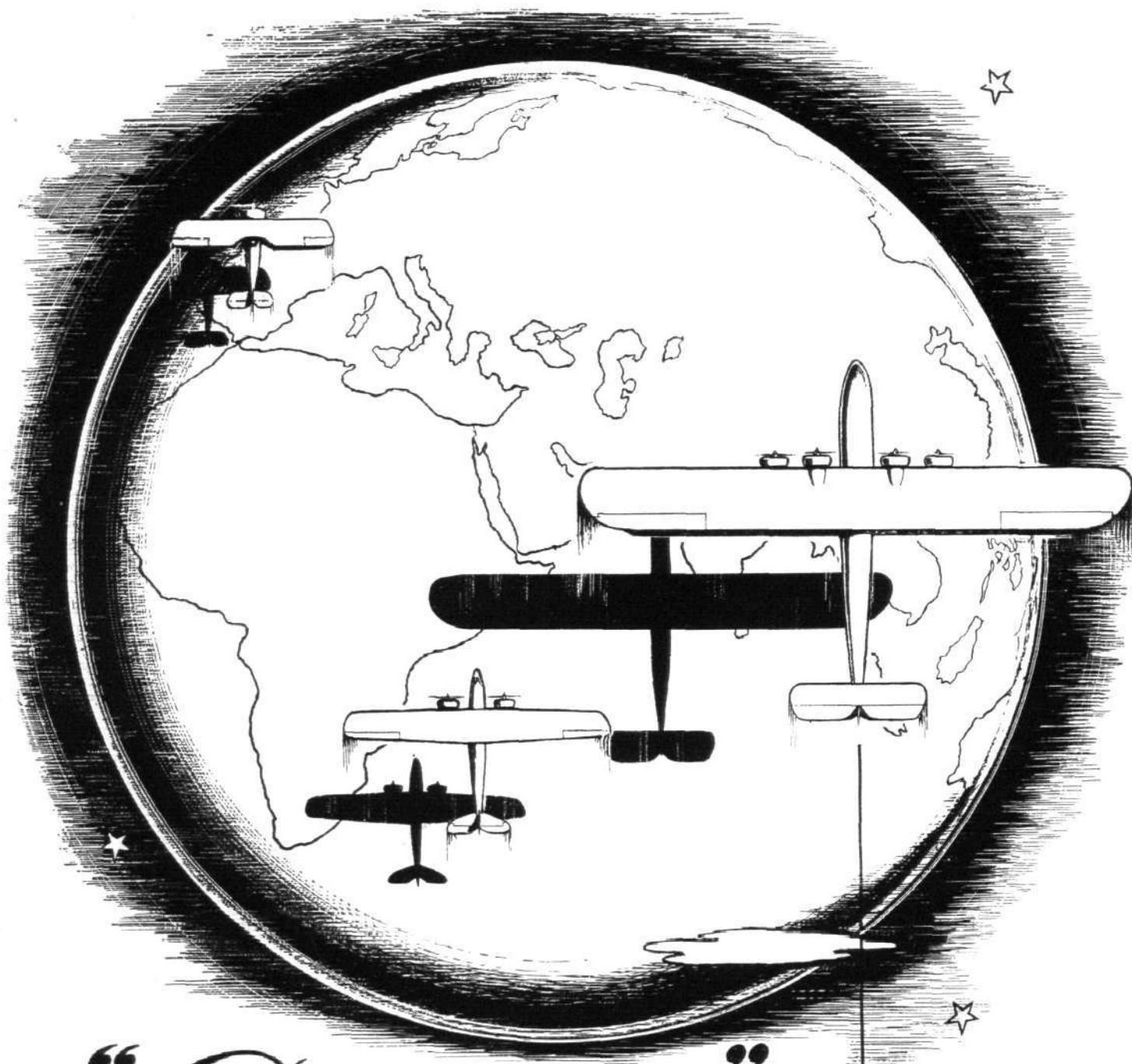
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